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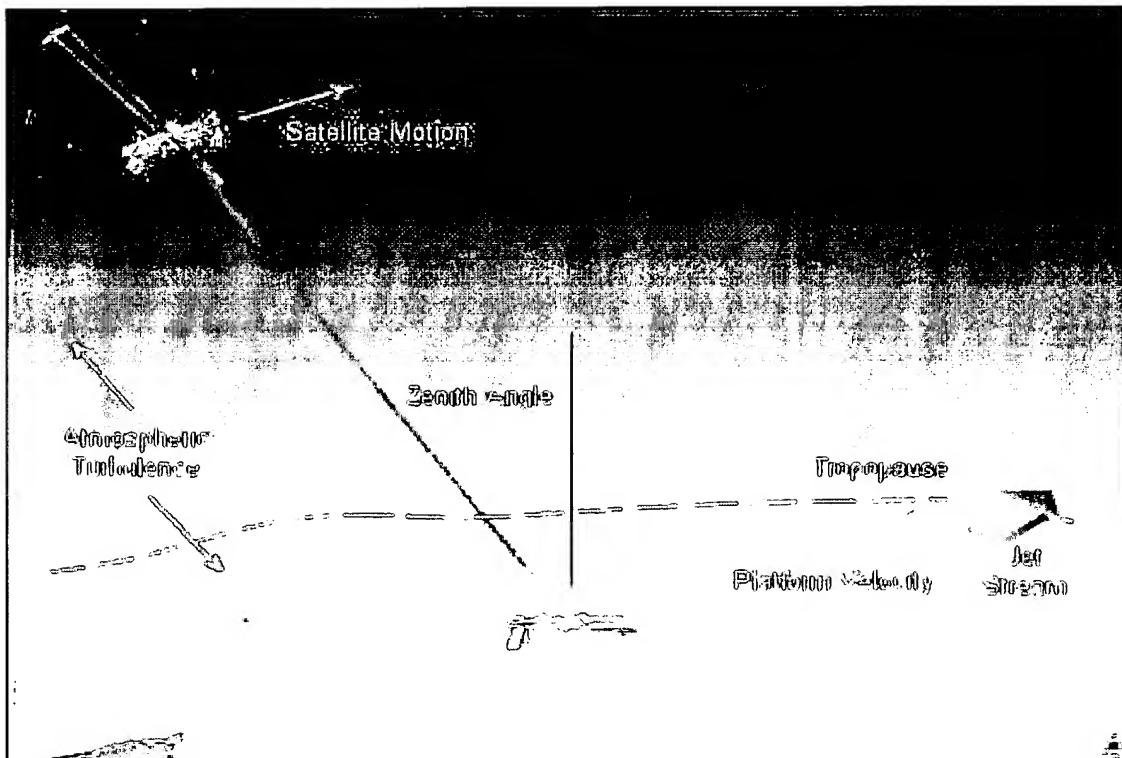
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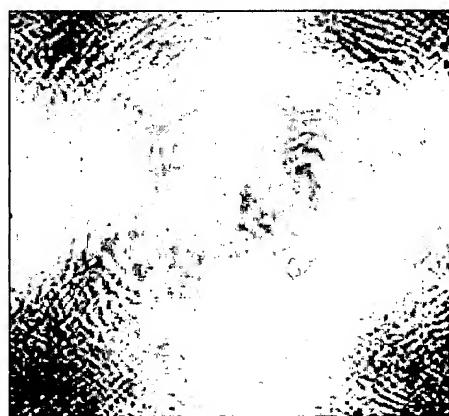
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## Platform Parameters

FIG. 1A



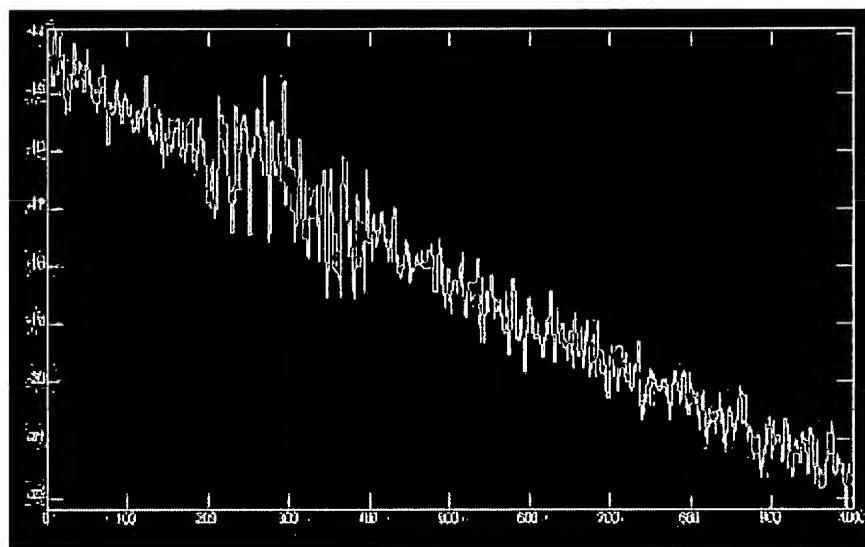
## Phase Map Through Turbulence

FIG. 1B



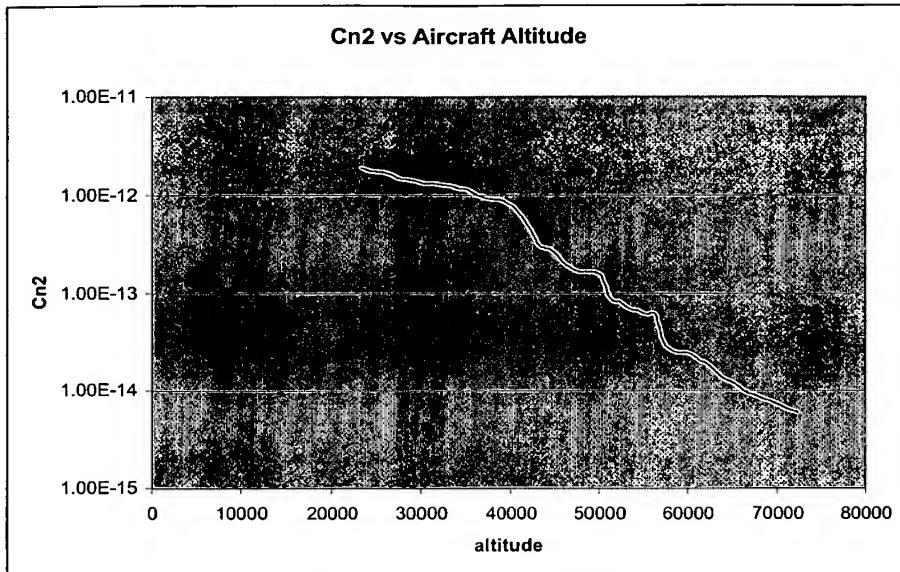
Time Sequence of Beam Distribution at Satellite  
(bar represents 10m at 1000km)

FIG. 1C



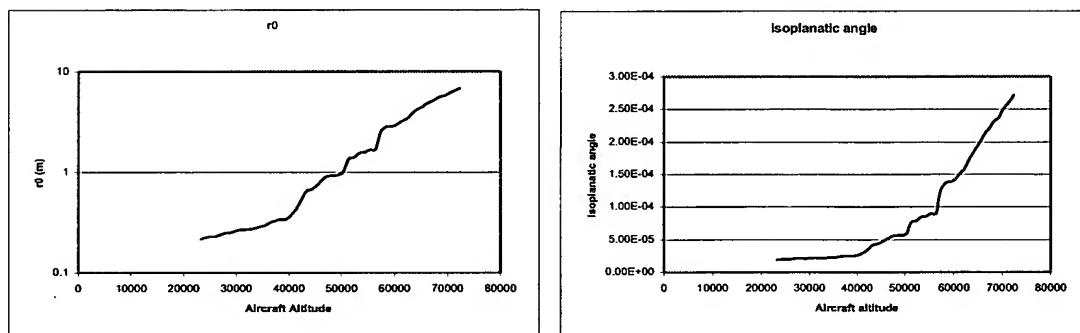
Simulated  $C_n^2$  profile

FIG. 1D



Integrated  $C_n^2$  versus aircraft altitude in feet

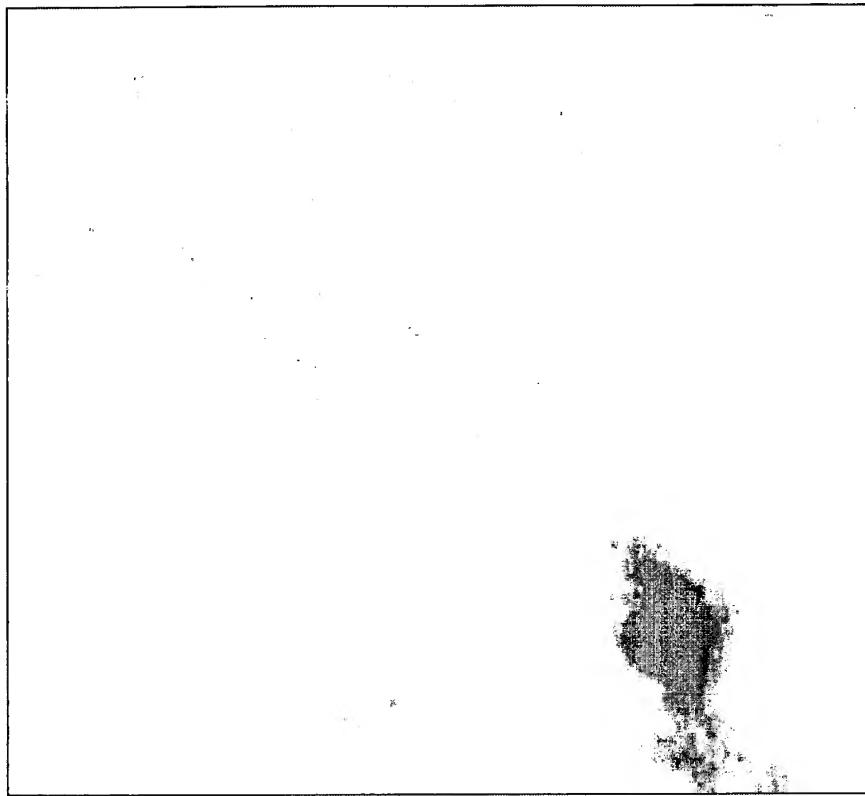
**FIG. 1E**



Atmospheric coherence parameters versus aircraft altitude

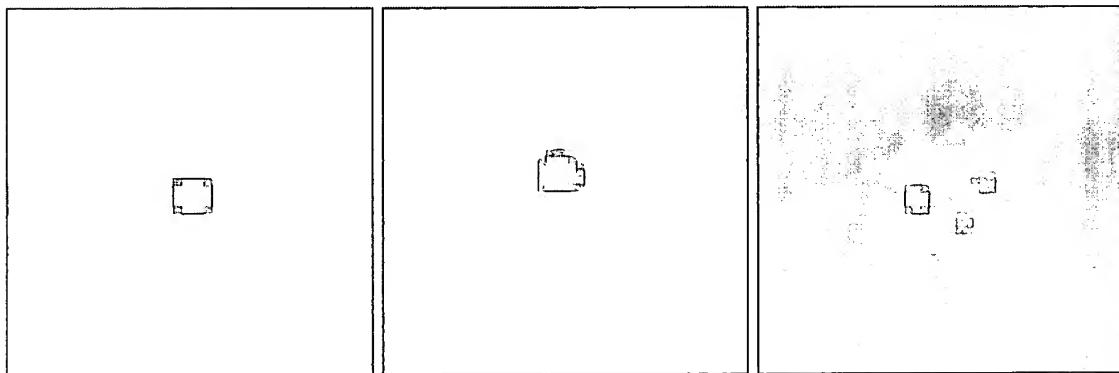
**FIG. 1F1**

**FIG. 1F2**



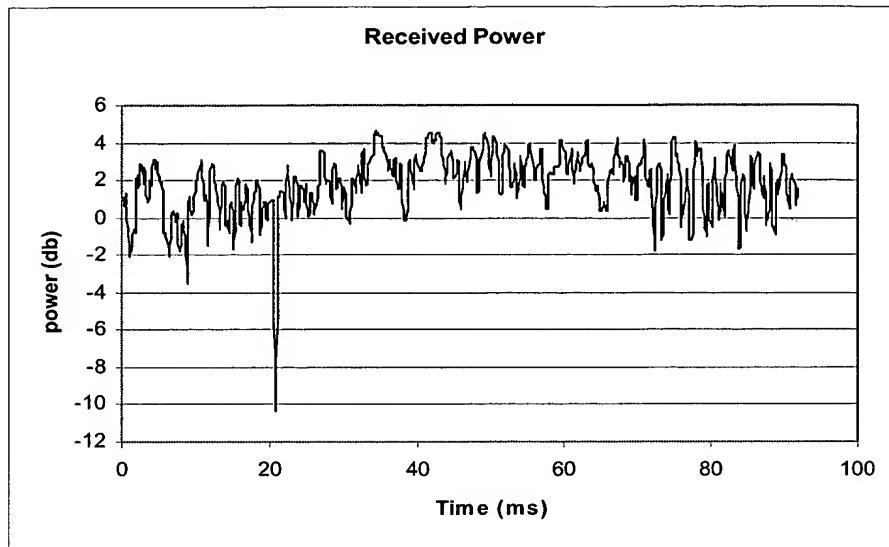
Simulated turbulence induced phase error

**FIG. 1G**



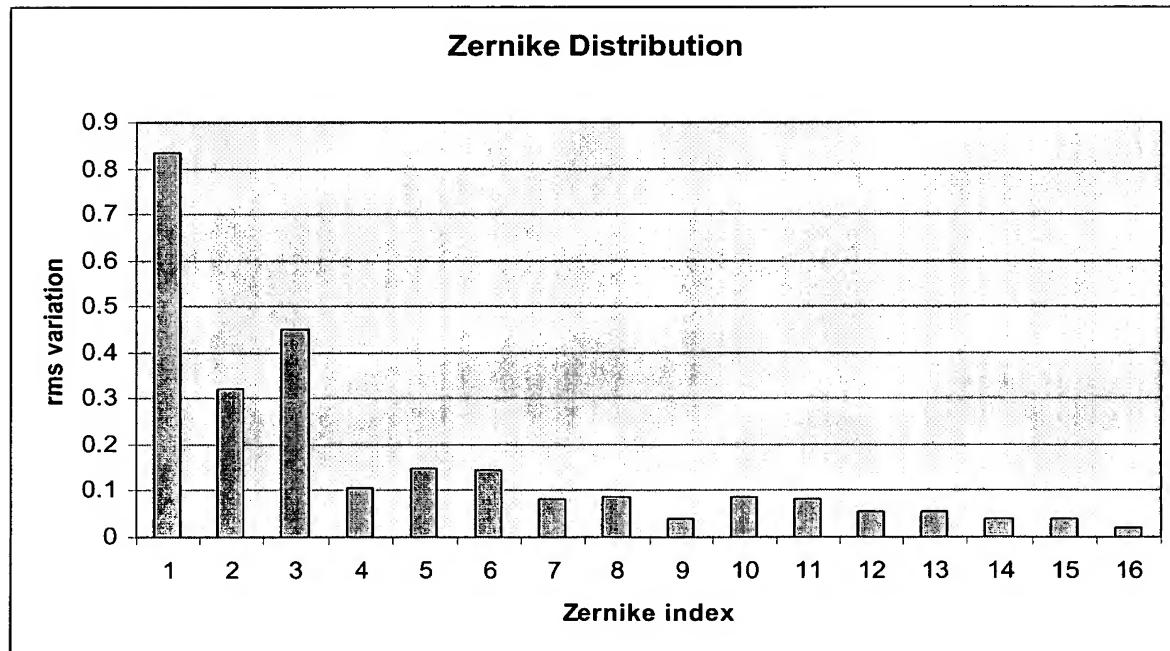
Diffraction limited beam profile (left) and typical beam profiles at satellite

**FIG. 1H**



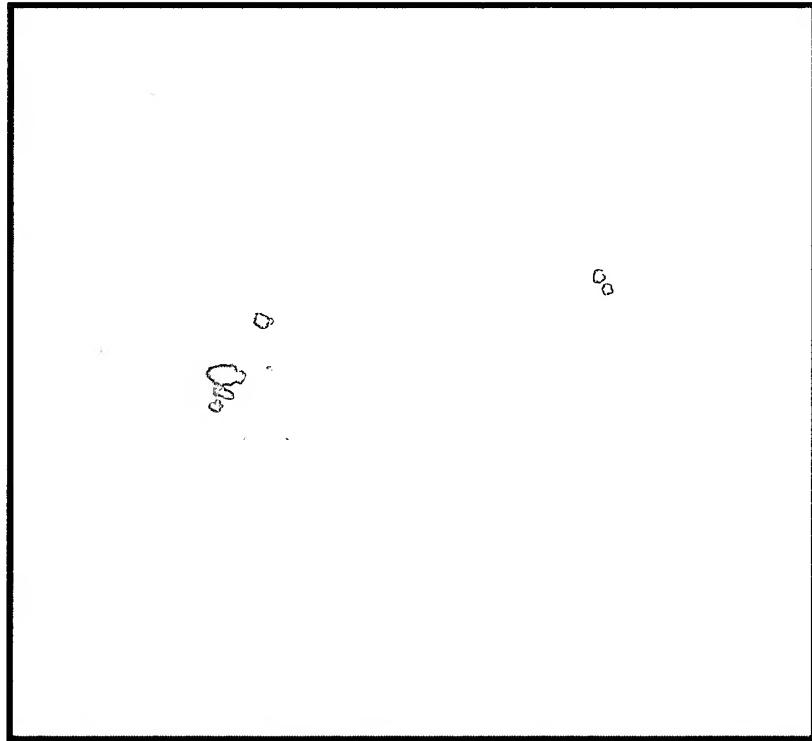
Time Series of Received Power

**FIG. 1I**



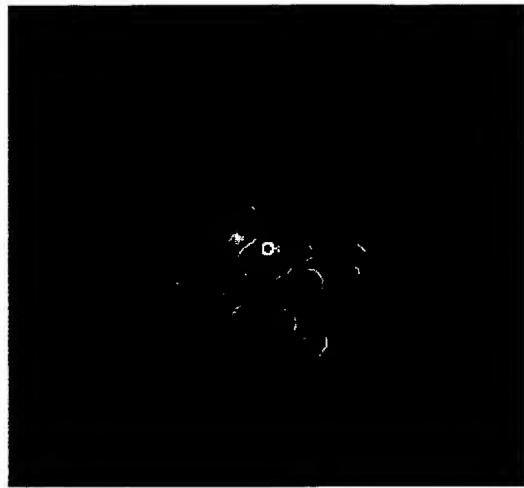
Temporal Variation in Lowest 15 Zernike terms

**FIG. 1J**



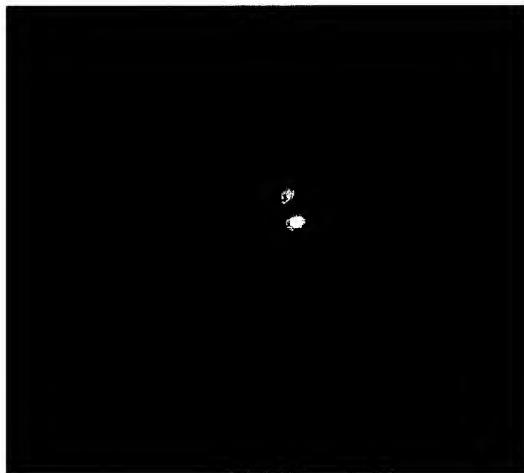
Intensity distribution at receiver aperture

**FIG. 1K**



Spot during a deep fade event

**FIG. 1M**



Typical calculated spot at detector plane

**FIG. 1L**

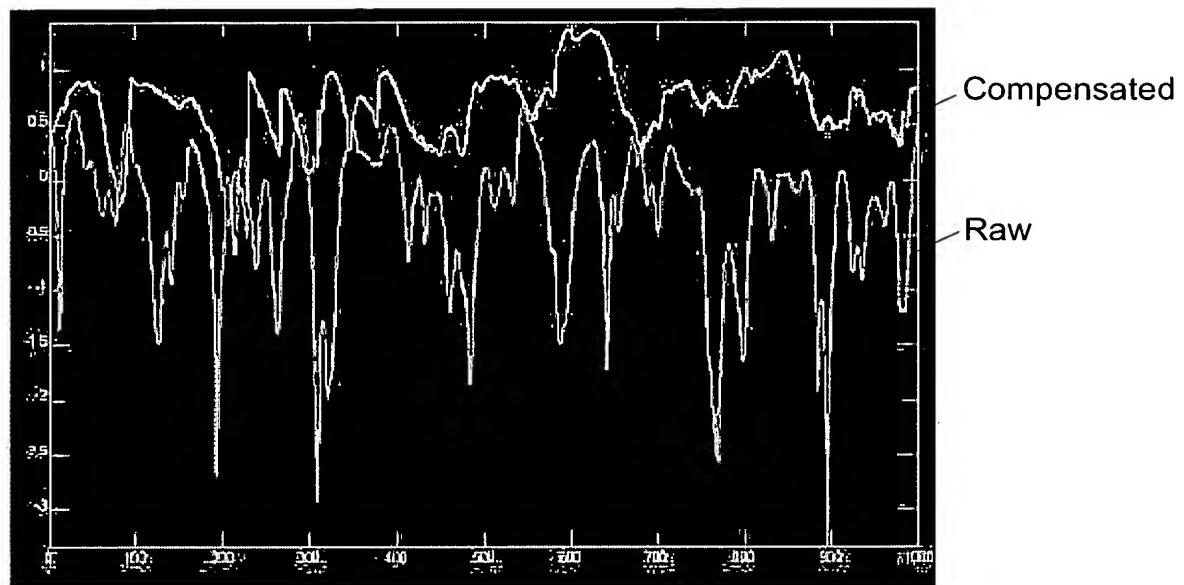


FIG. 1N

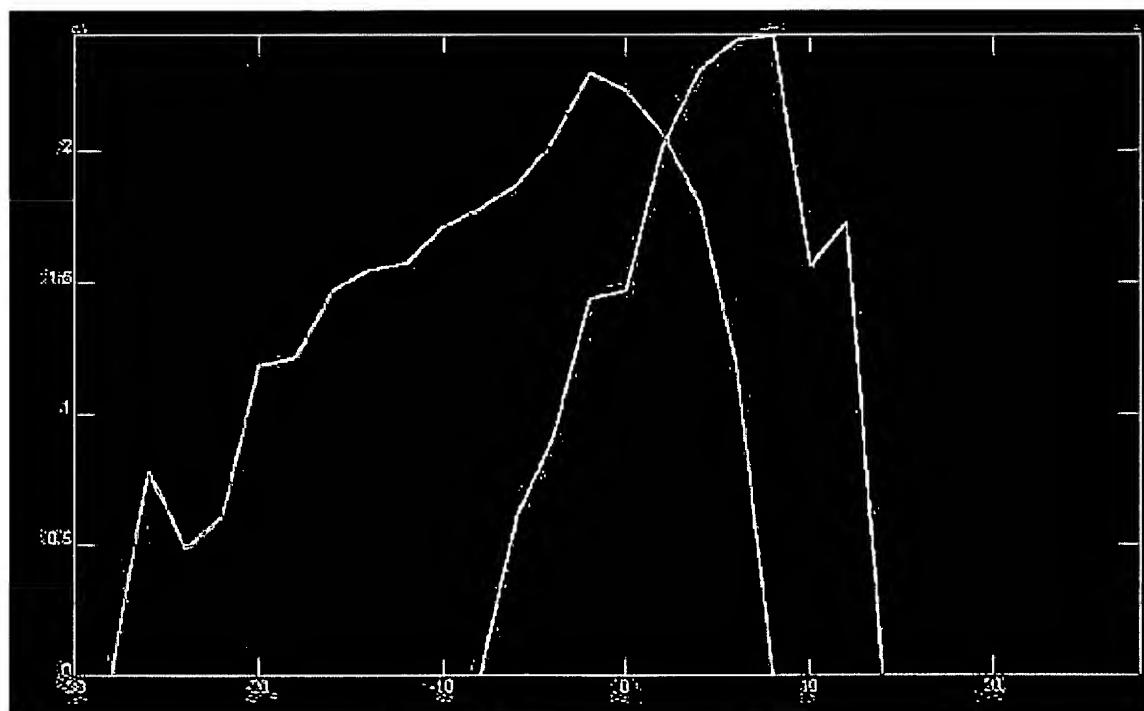
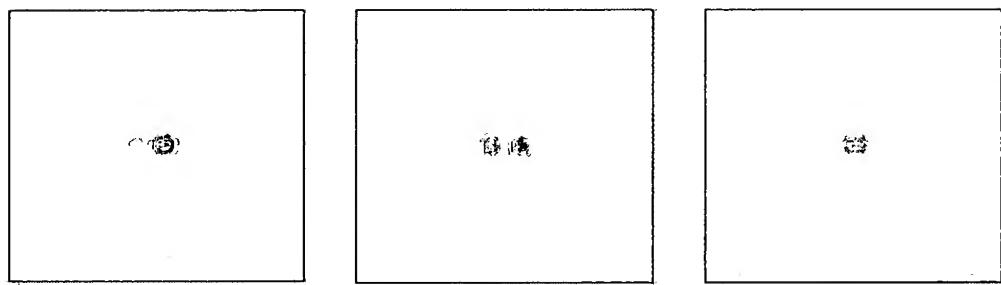


FIG. 1O



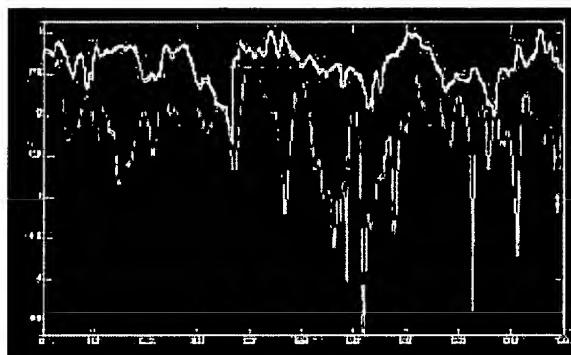
Blur spots formed by aperture with 0.2, 0.5, and 1.0 wave phase steps

FIG. 1P

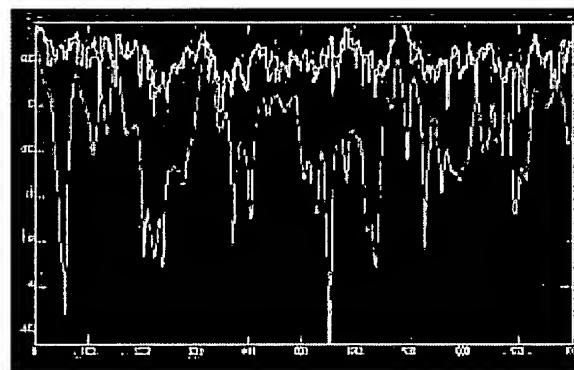


Modulation of a speckle pattern by a phase step

**FIG. 1Q**

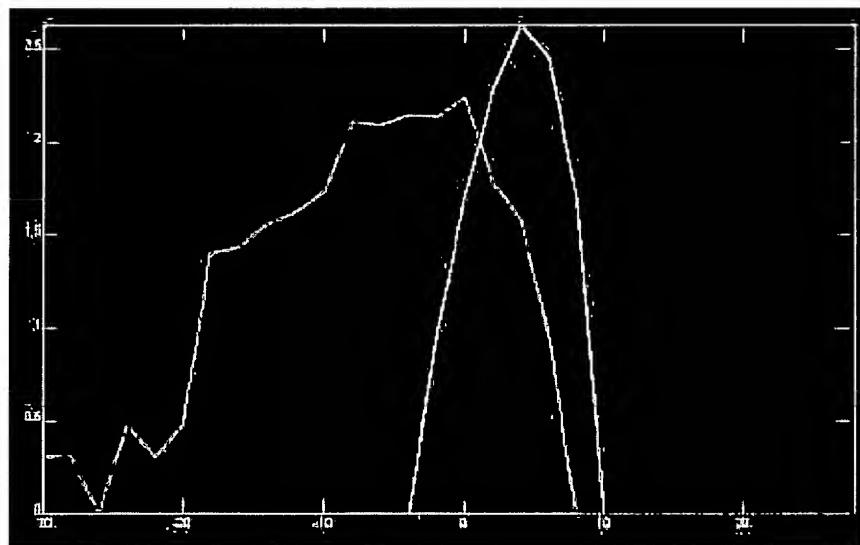


**FIG. 1R1**



**FIG. 1R2**

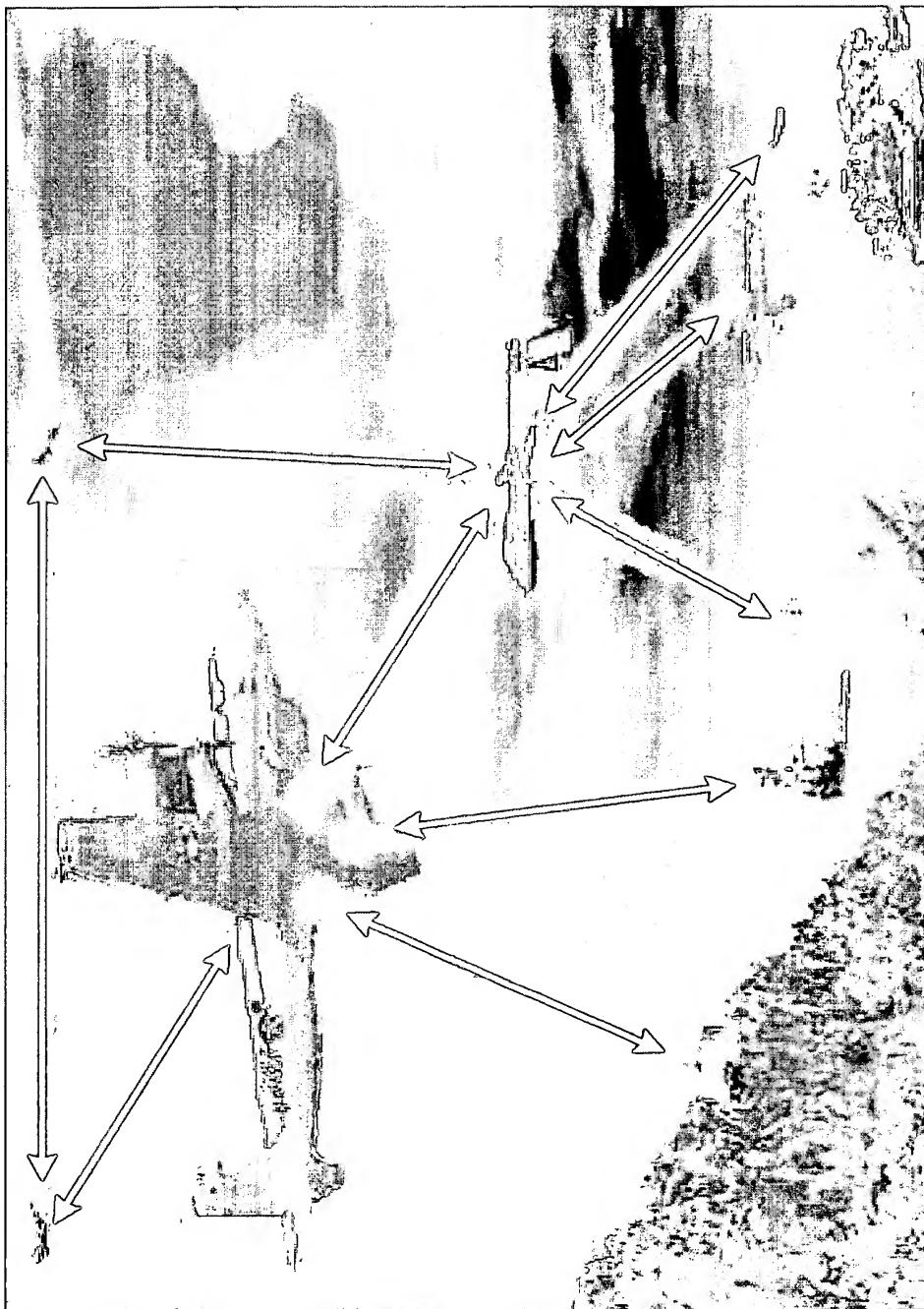
Log intensity vs. iteration number.  
Left, 2X2 phase modulator; right, 4X4 phase modulator.



PDF for the data in Fig. 9K2

**FIG. 1S**

FIG. 2A



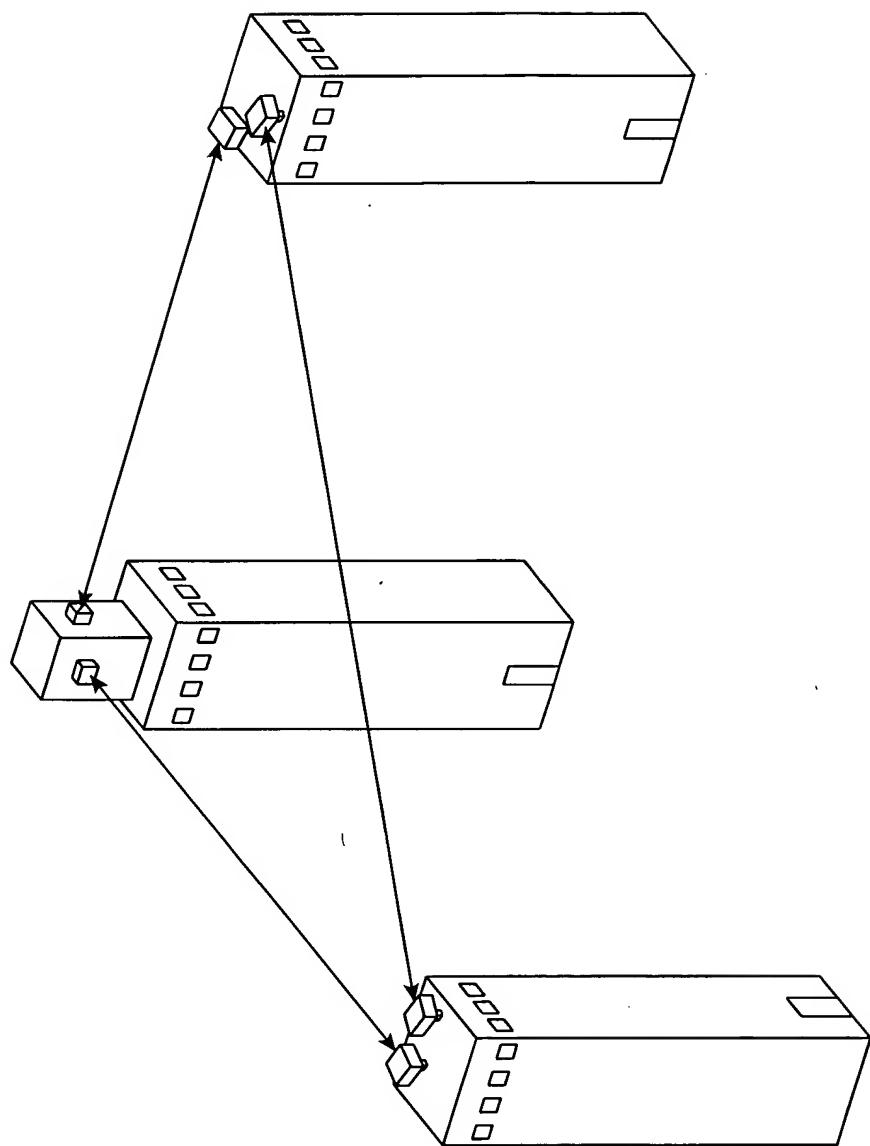


FIG. 2B

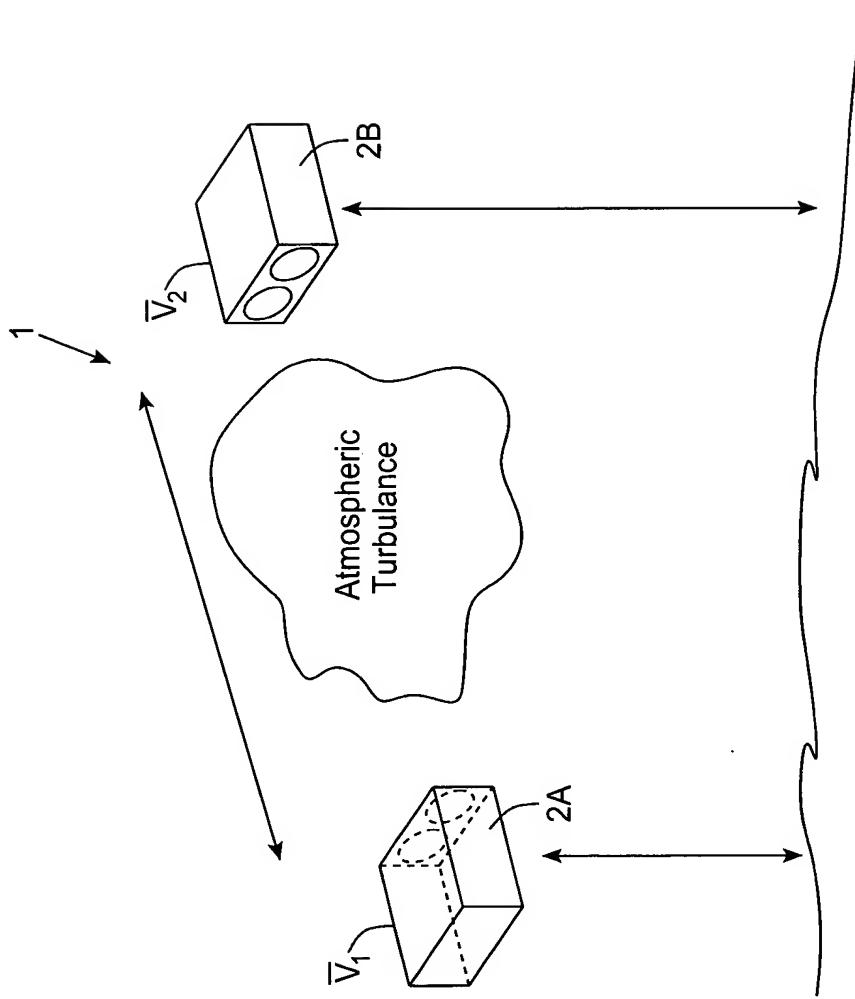


FIG. 3A

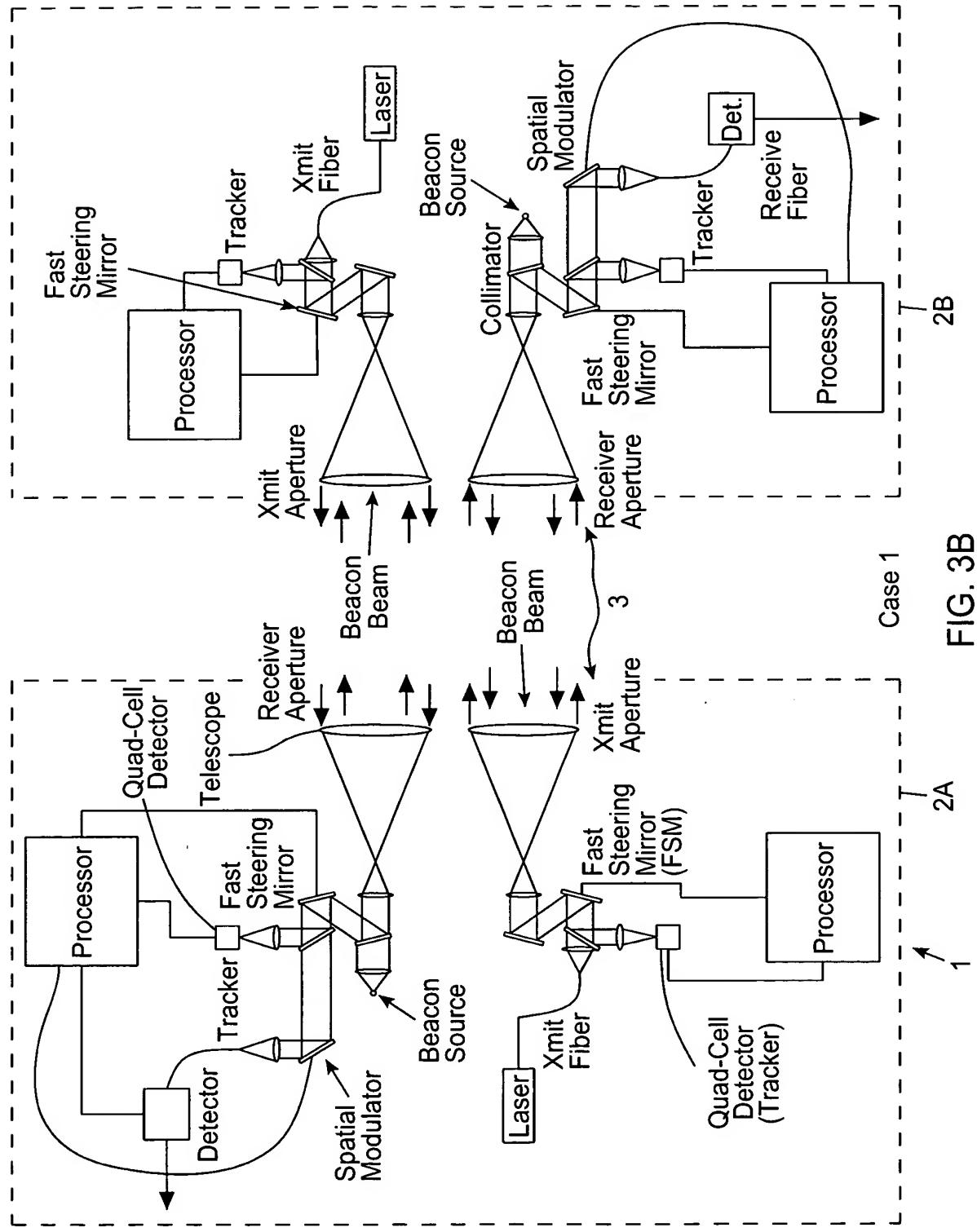


FIG. 3B

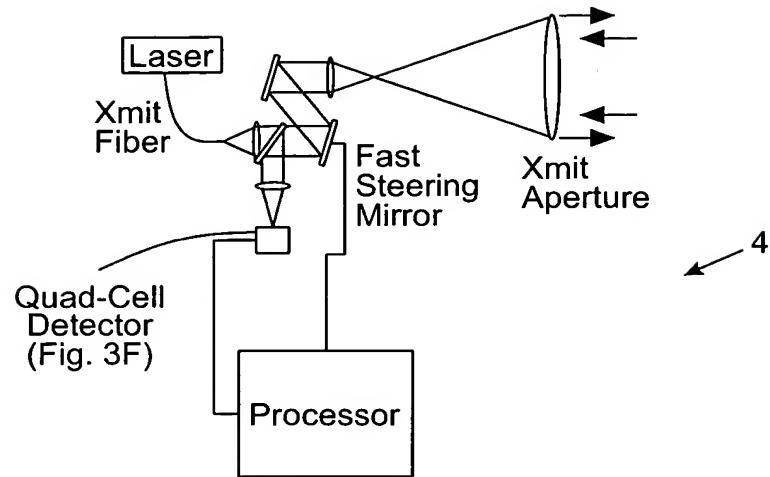


FIG. 3C

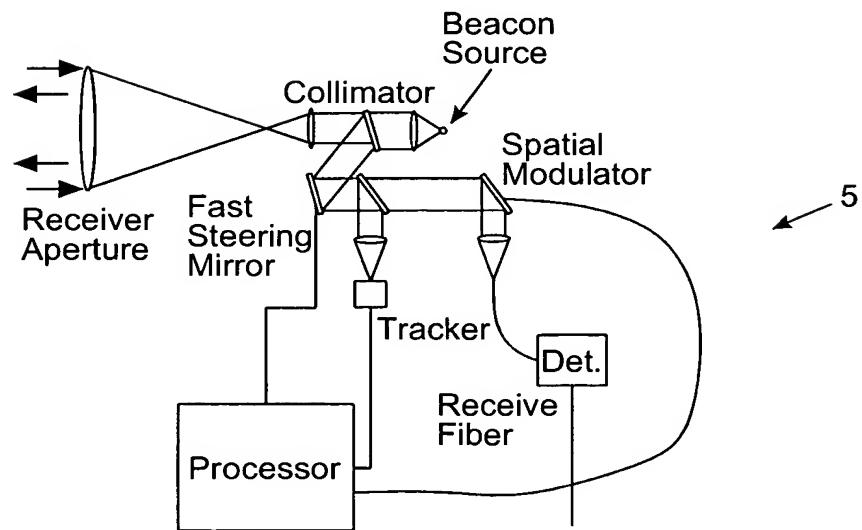


FIG. 3D

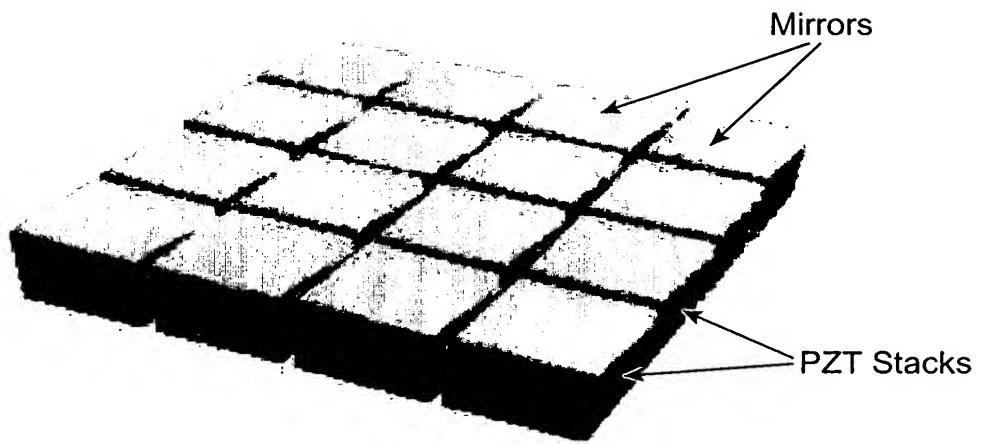


FIG. 3E

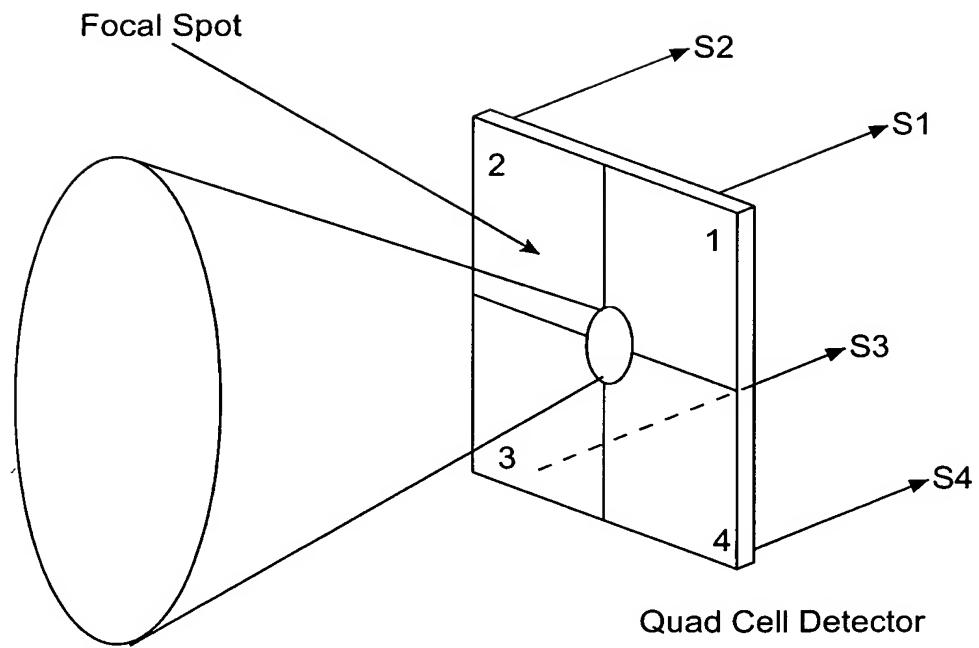
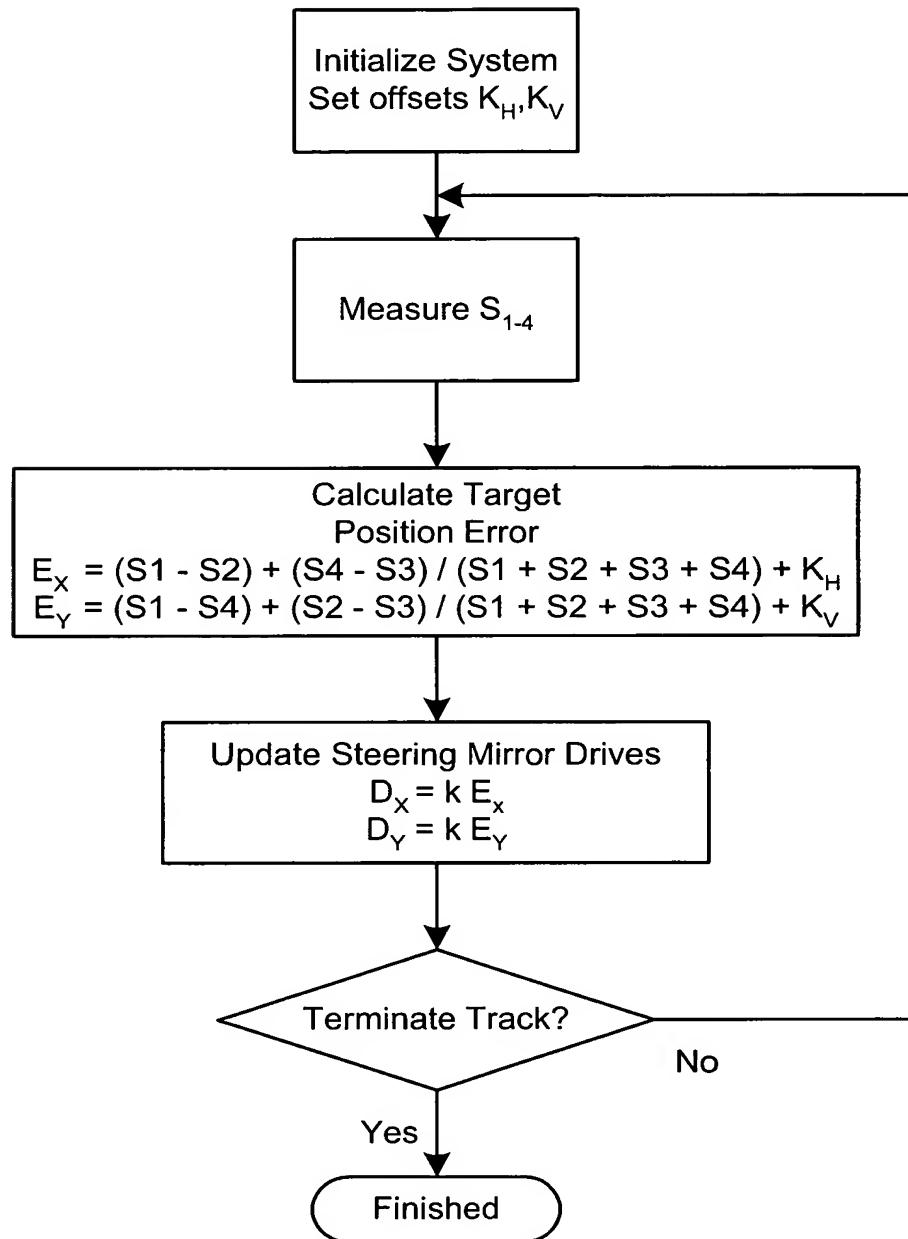


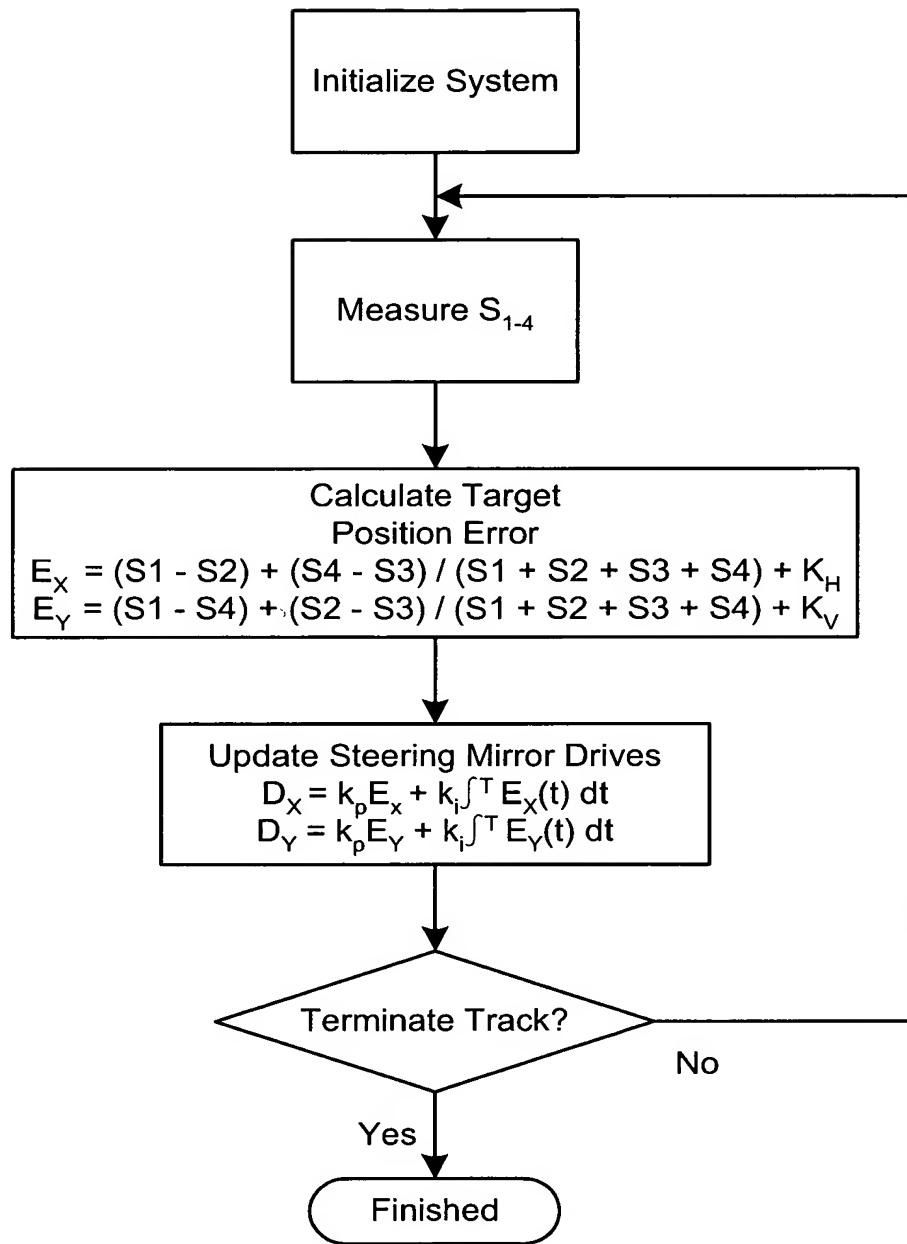
FIG. 3F



Proportional Control

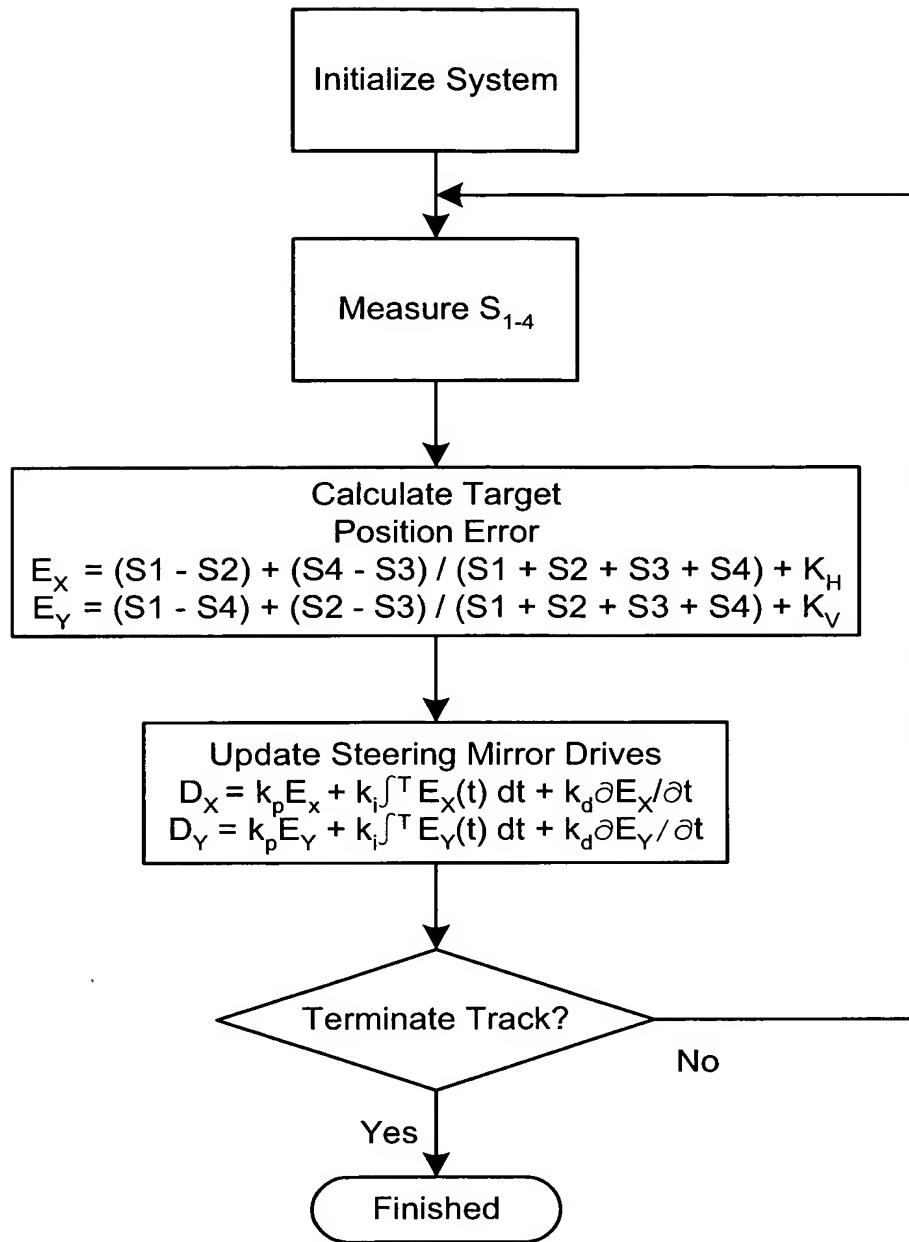
Transmitter

FIG. 4A



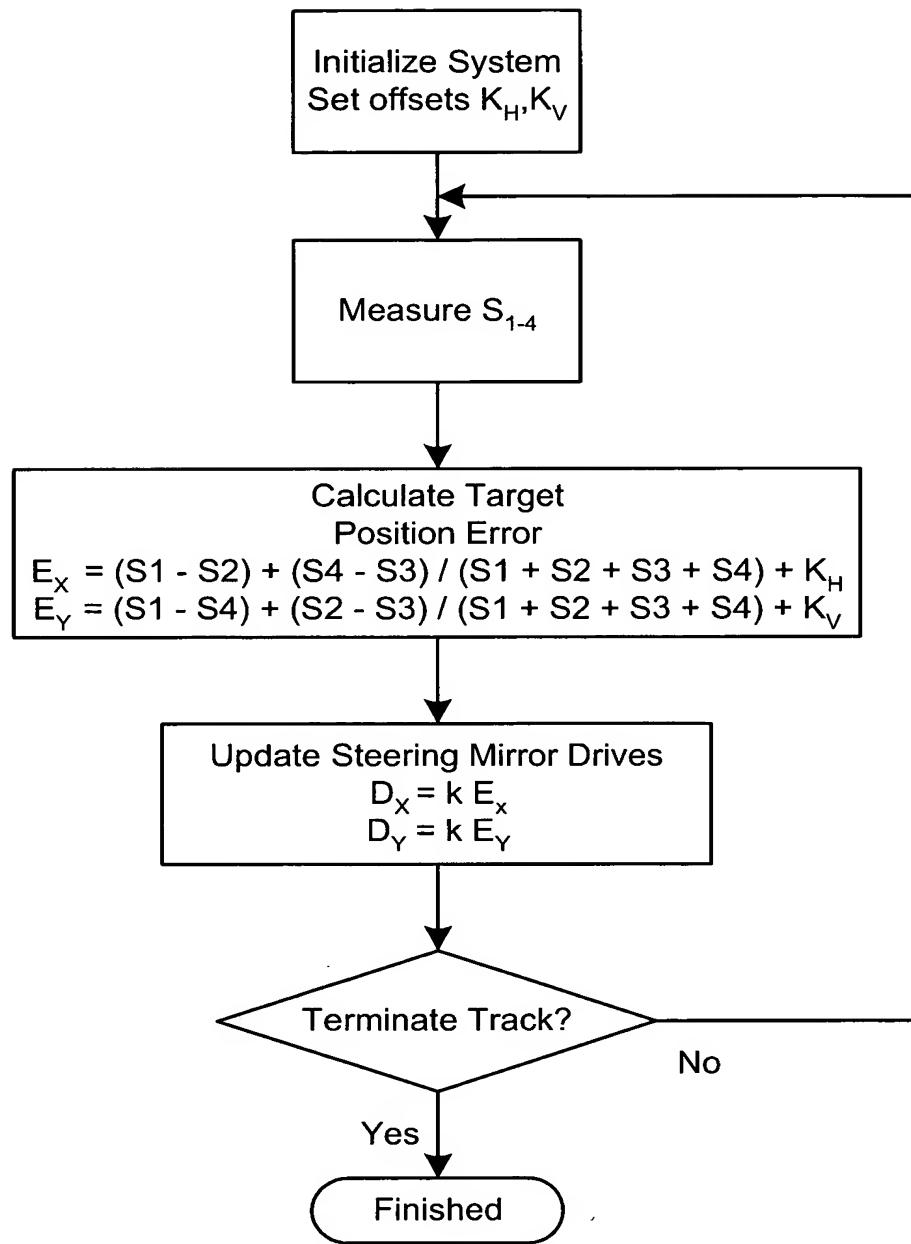
Proportional Plus Integral Control

FIG. 4B



Proportional Plus Integral Control Plus Derivative

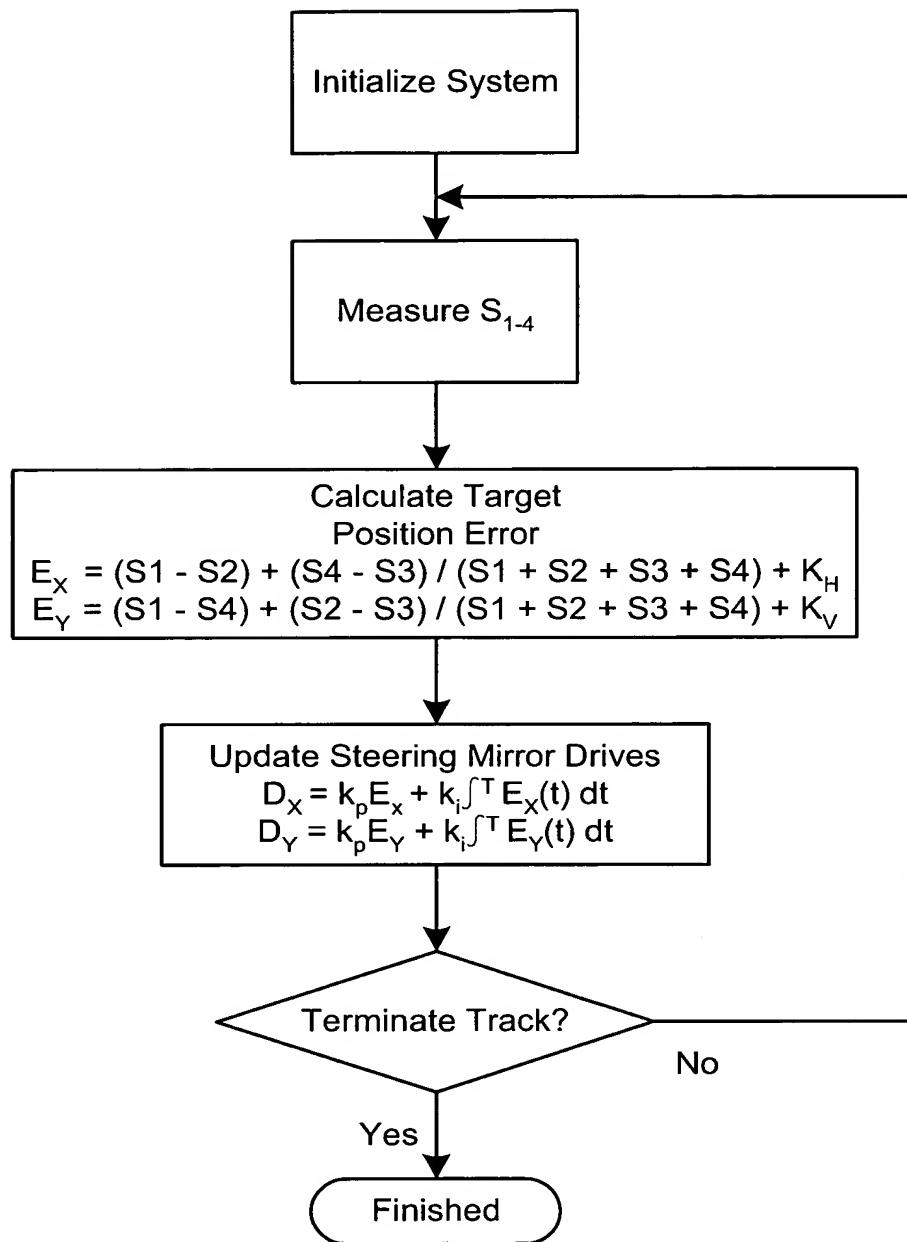
FIG. 4C



Proportional Control

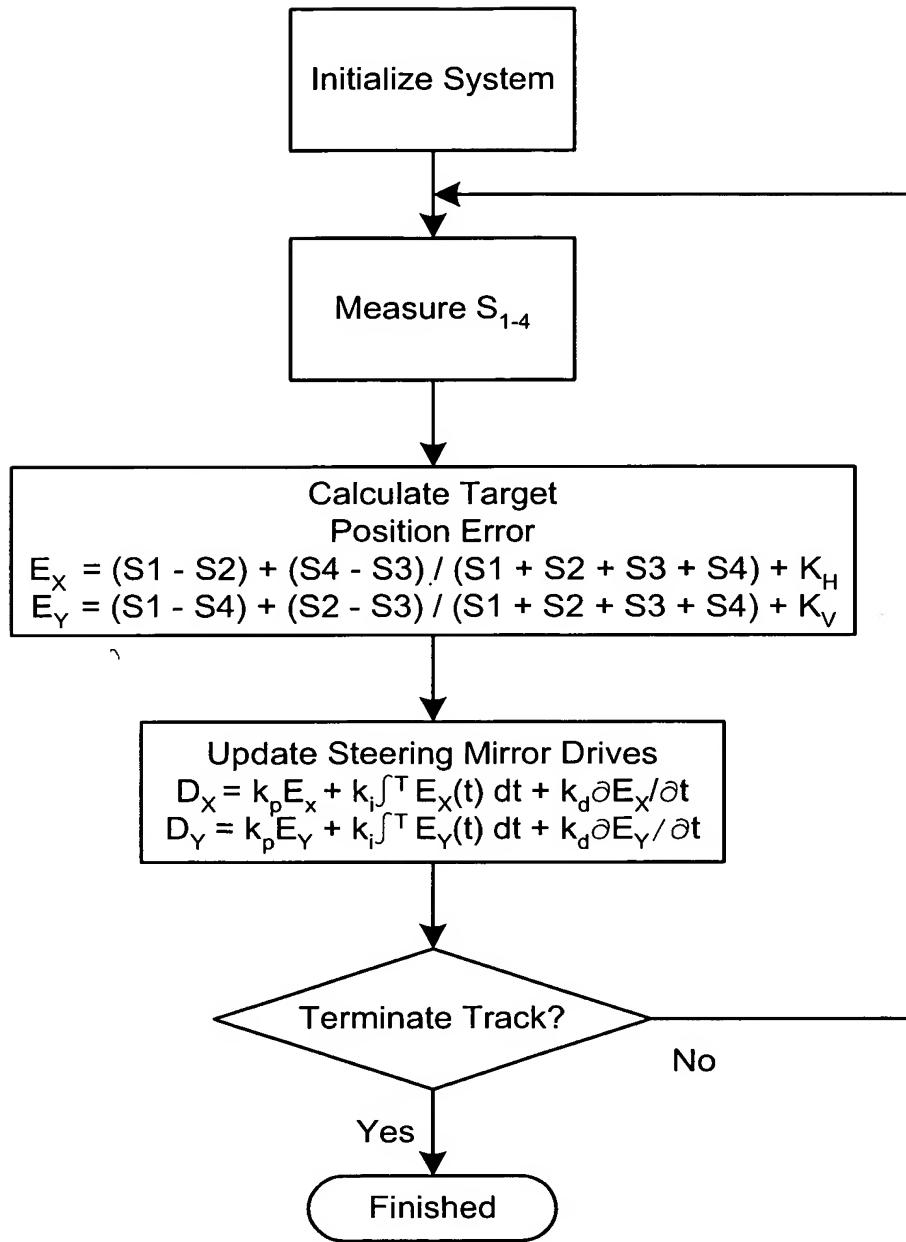
Receiver

FIG. 4D



Proportional Plus Integral Control

FIG. 4E



Proportional Plus Integral Control Plus Derivative

FIG. 4F

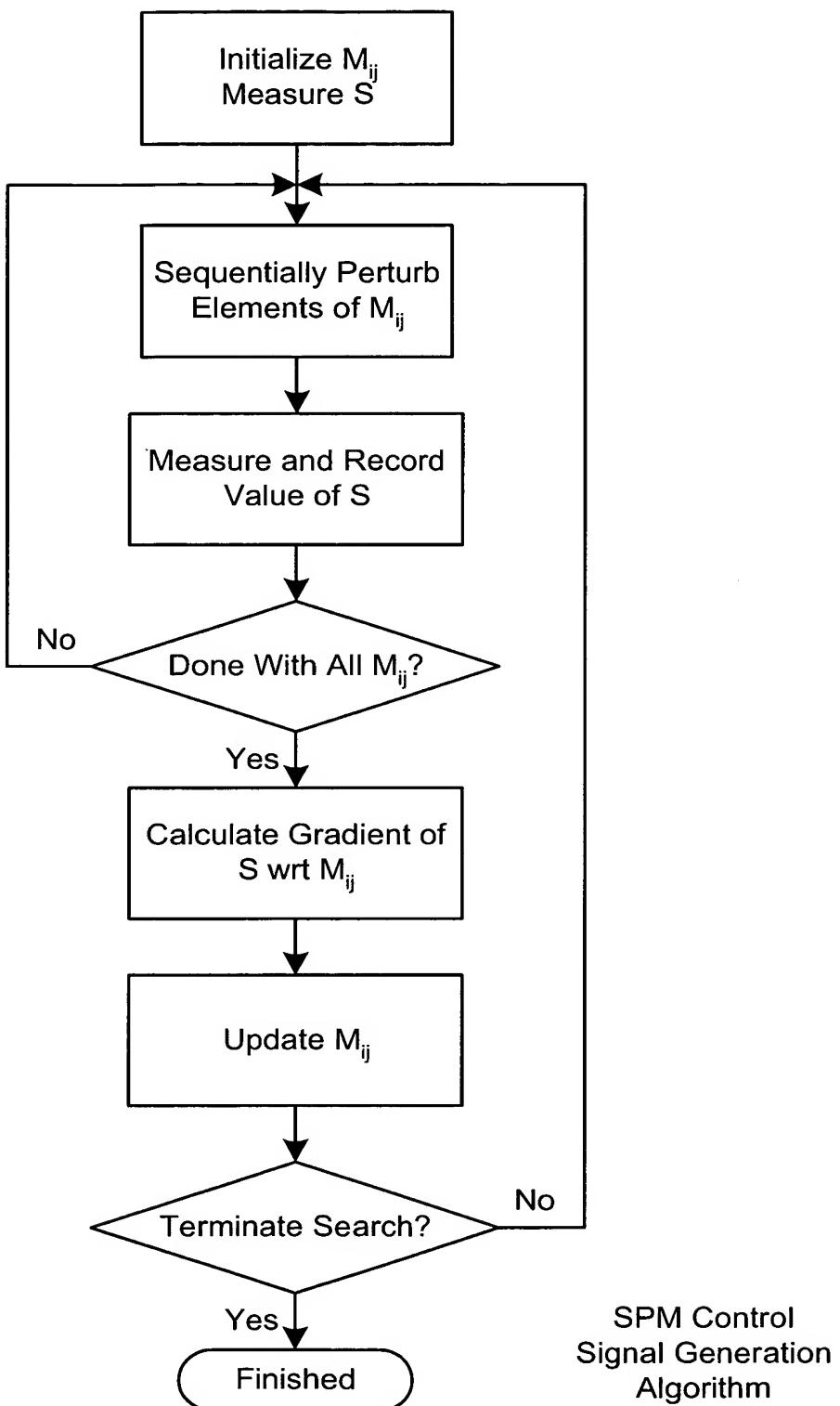


FIG. 5A

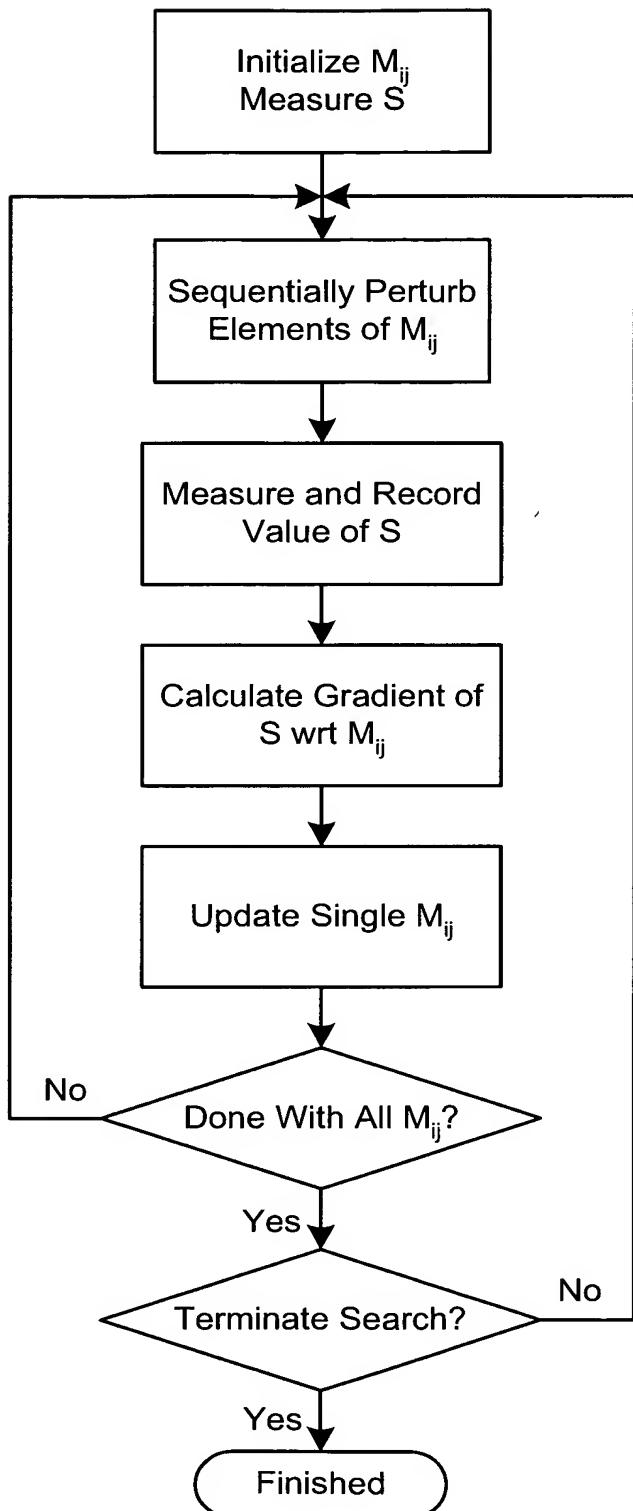


FIG. 5B

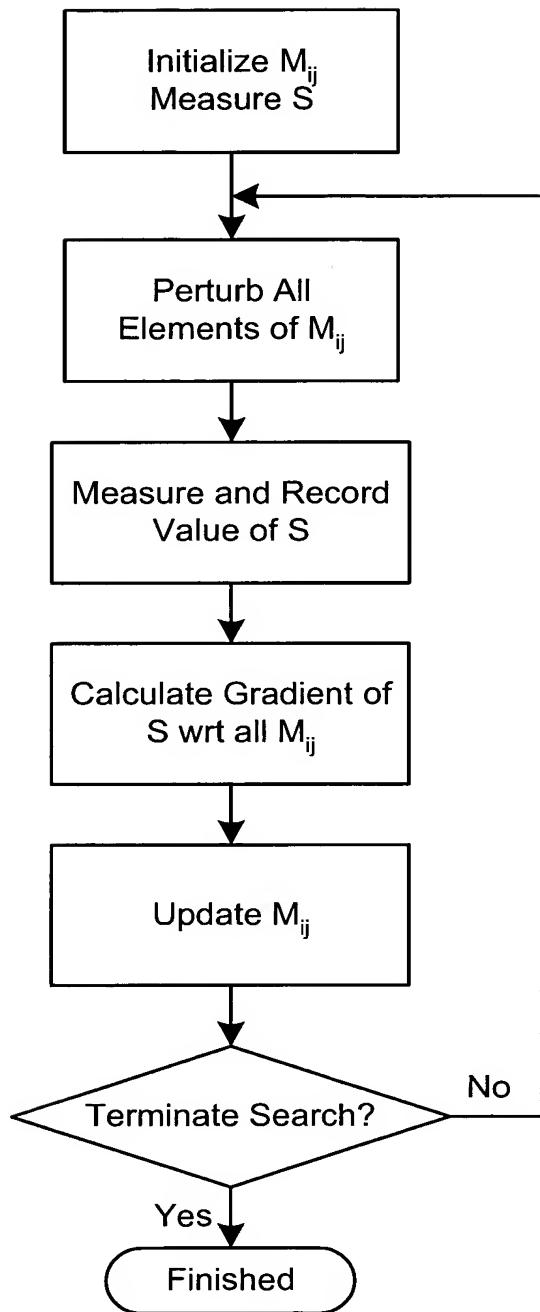


FIG. 5C

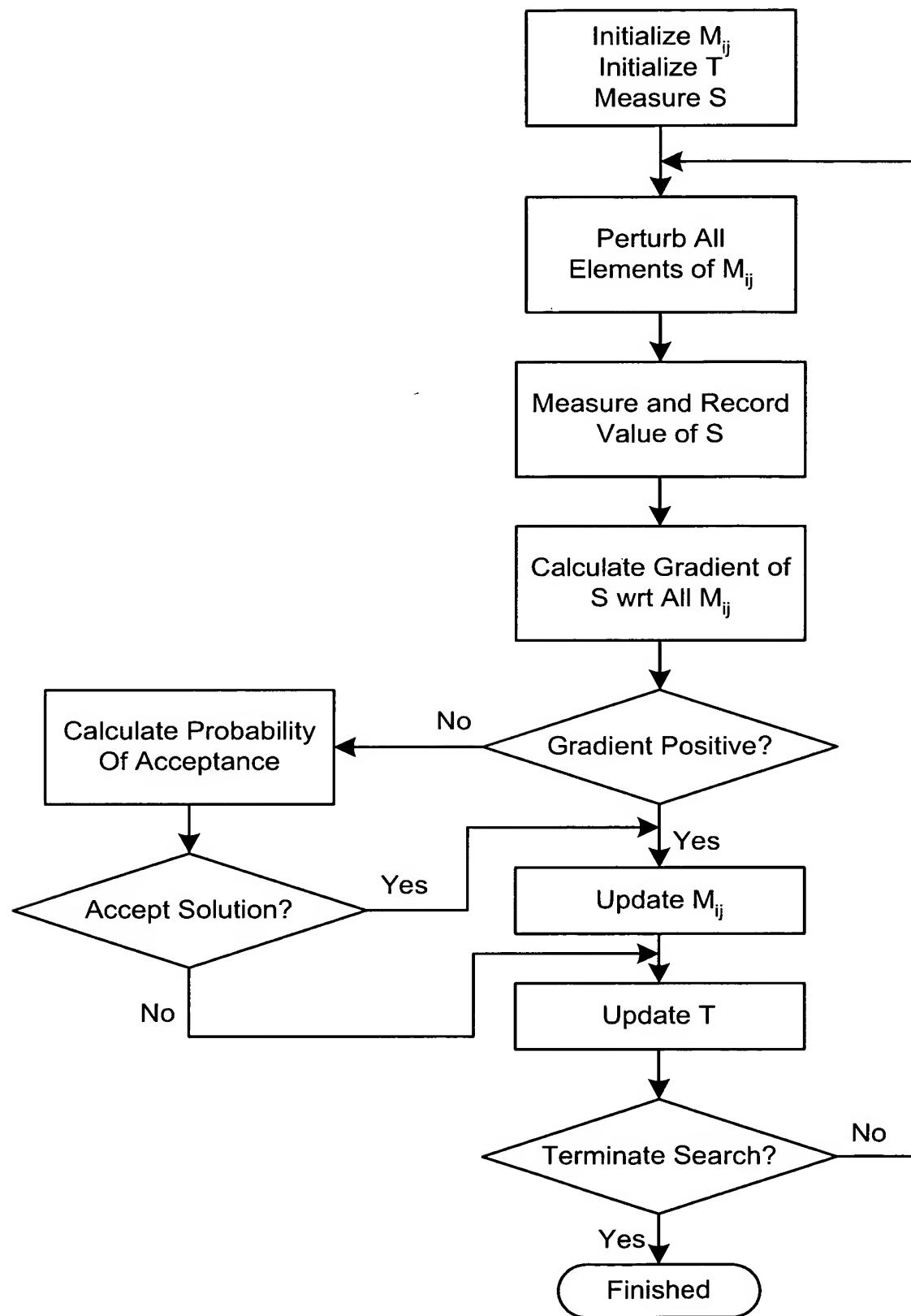


FIG. 5D

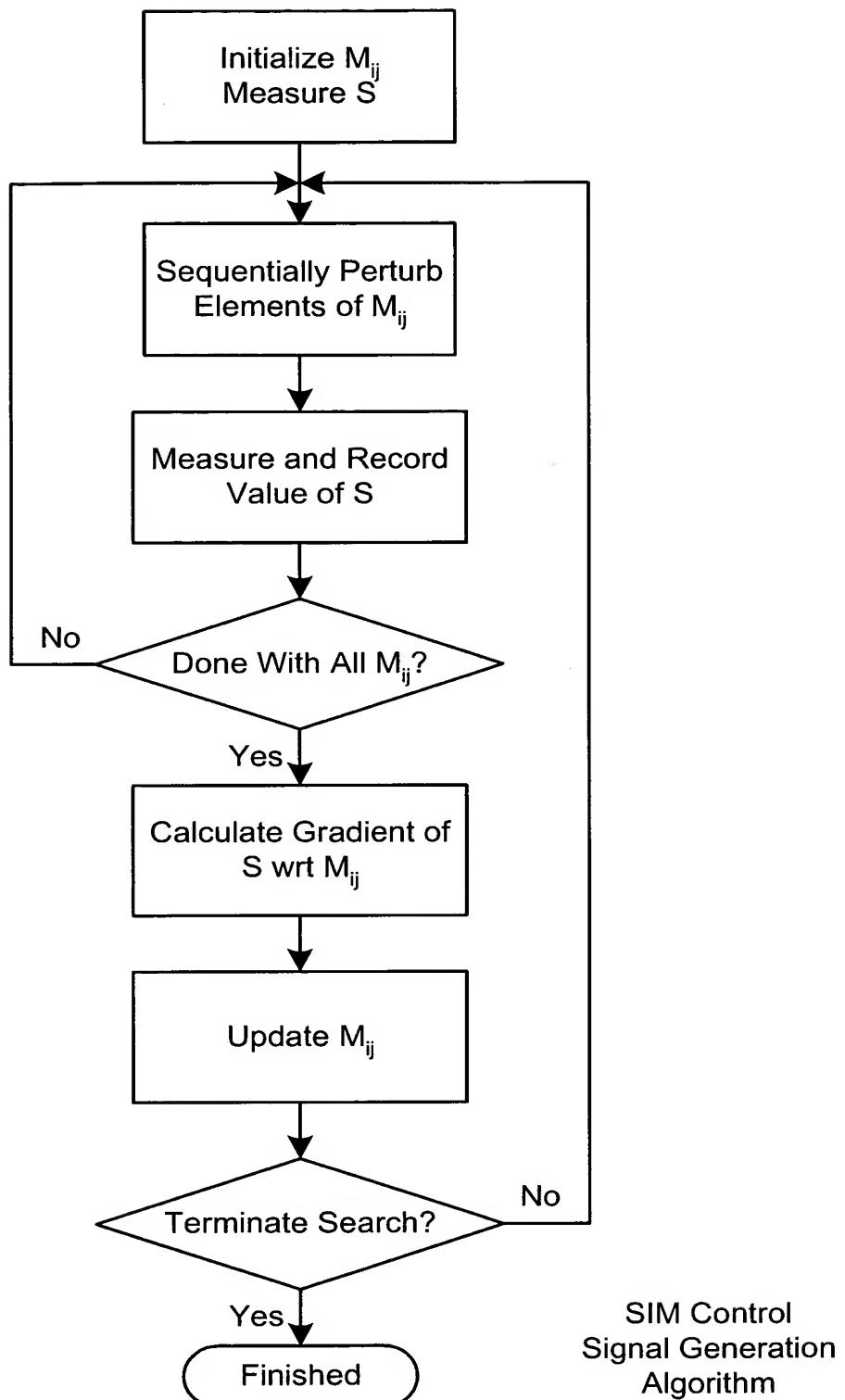


FIG. 6A

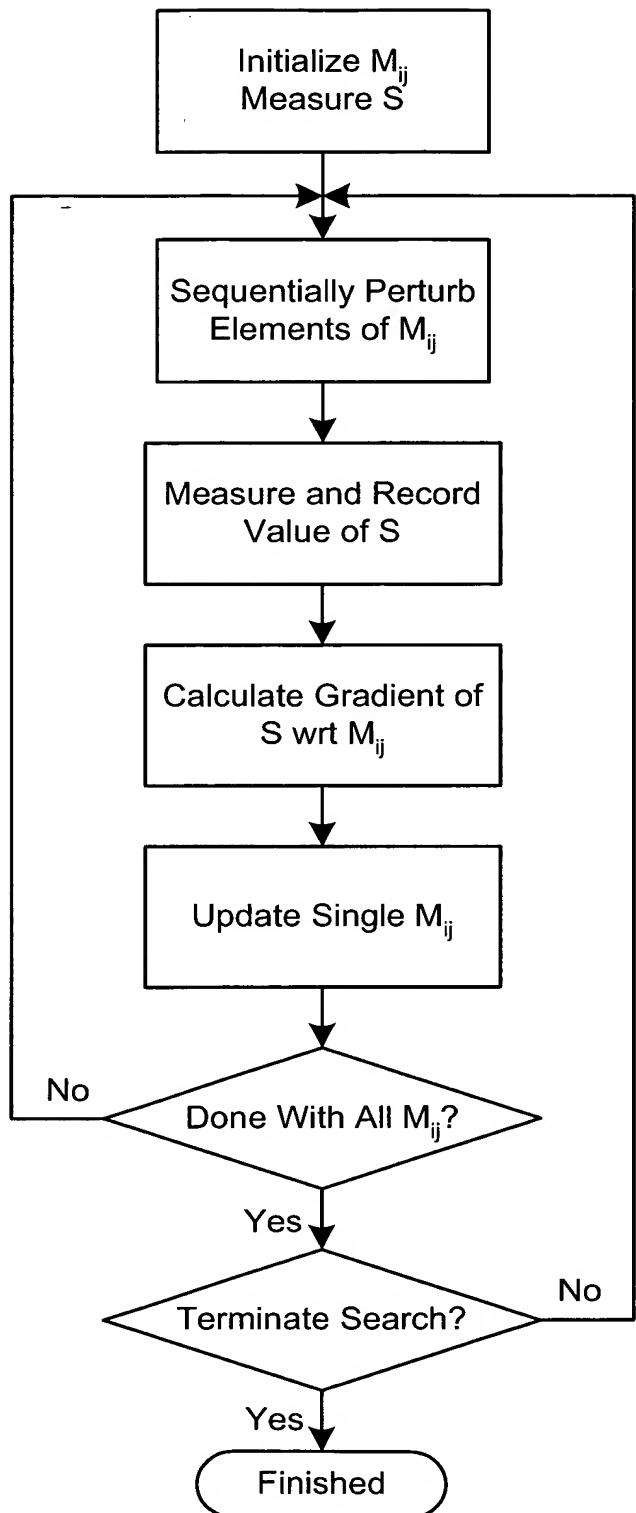


FIG. 6B

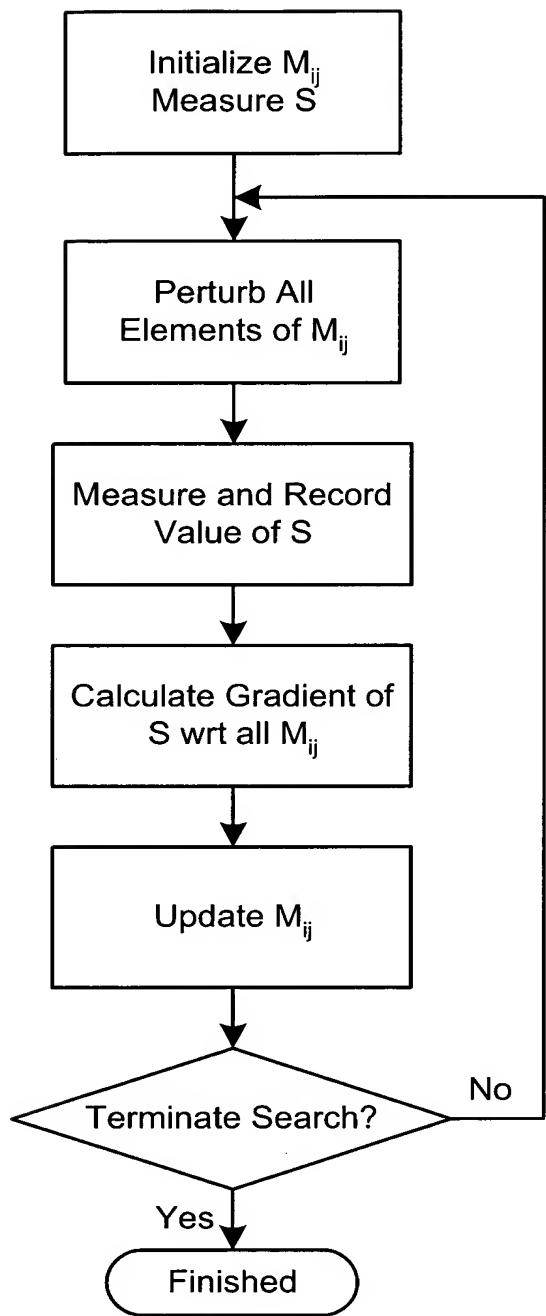


FIG. 6C

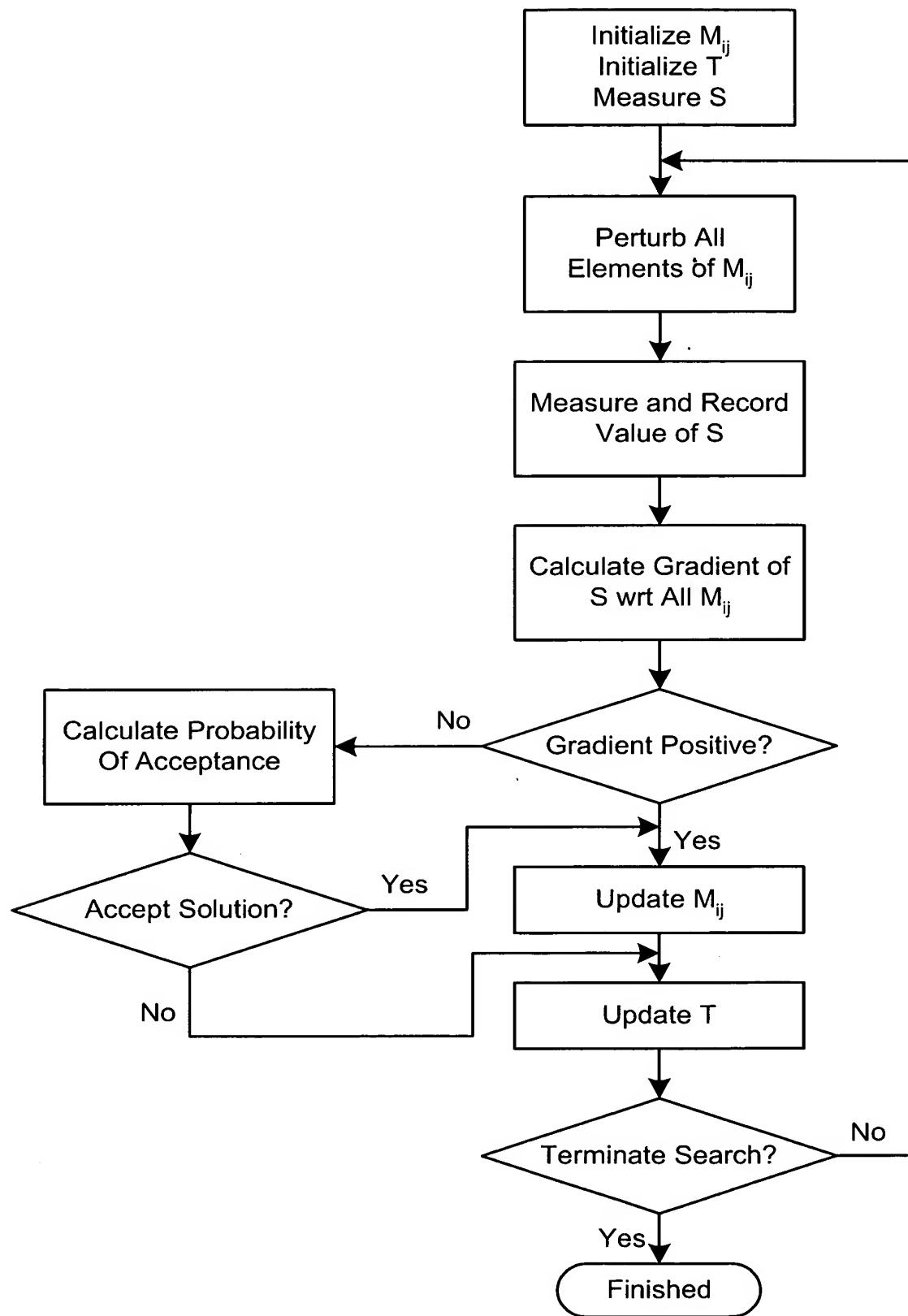


FIG. 6D

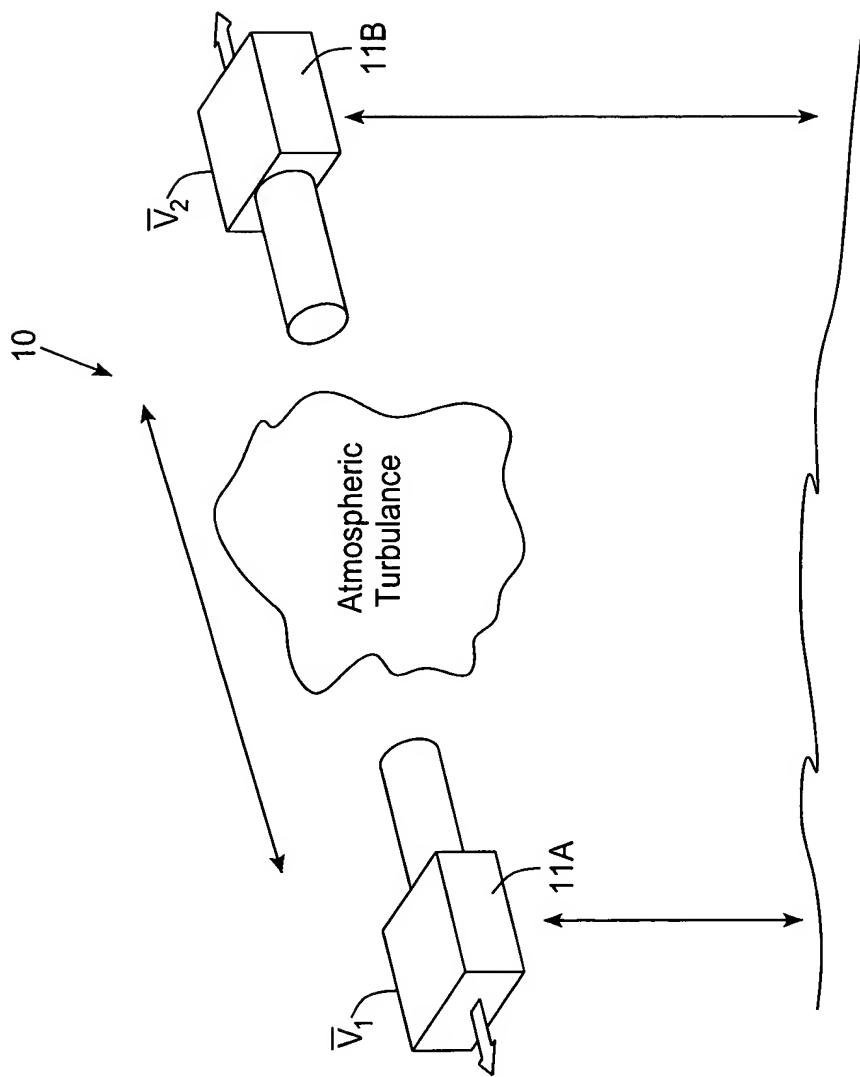


FIG. 7A

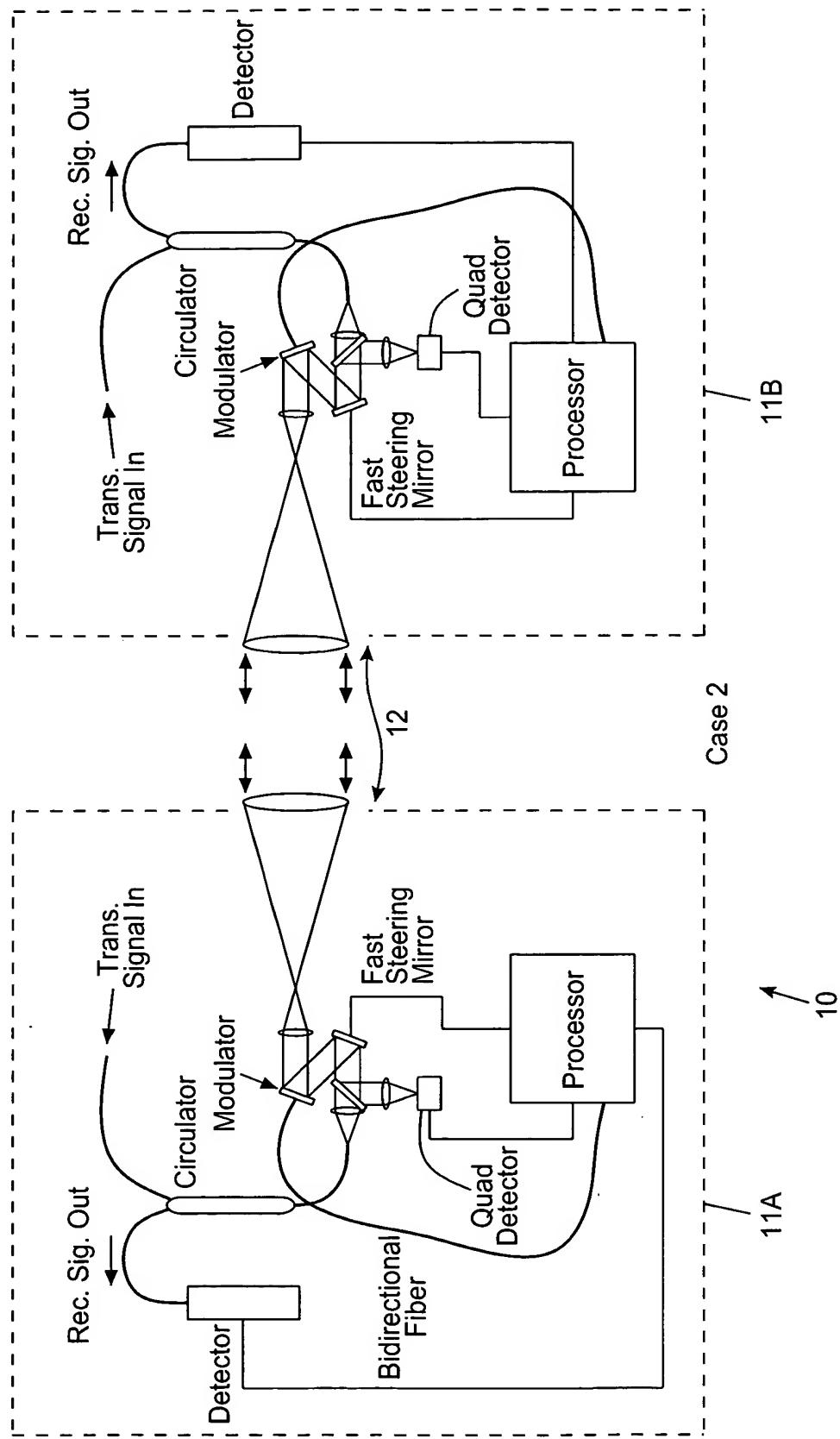


FIG. 7B

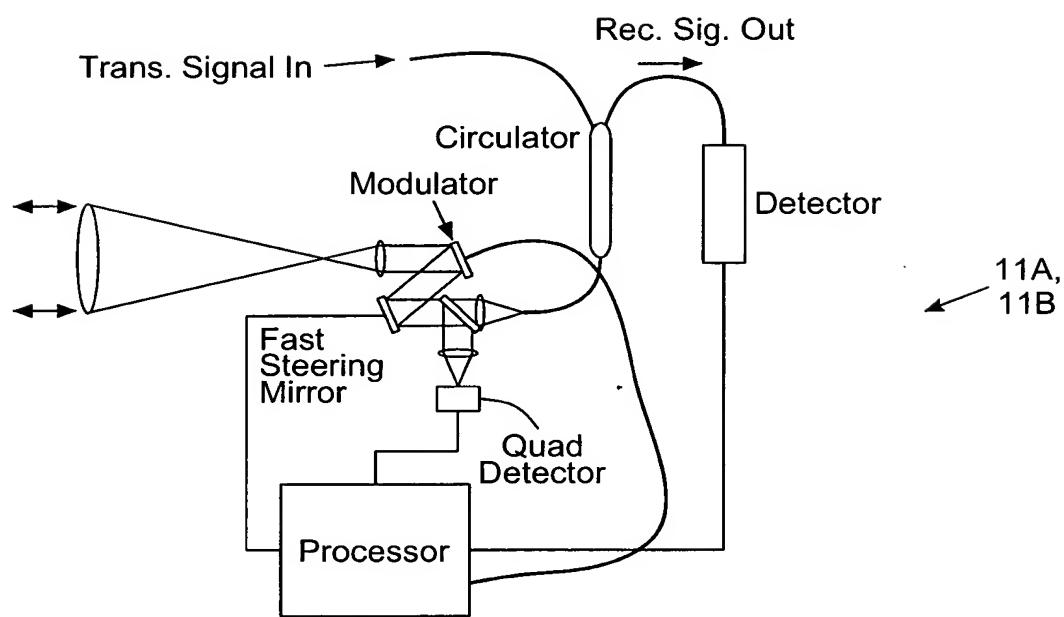


FIG. 7C

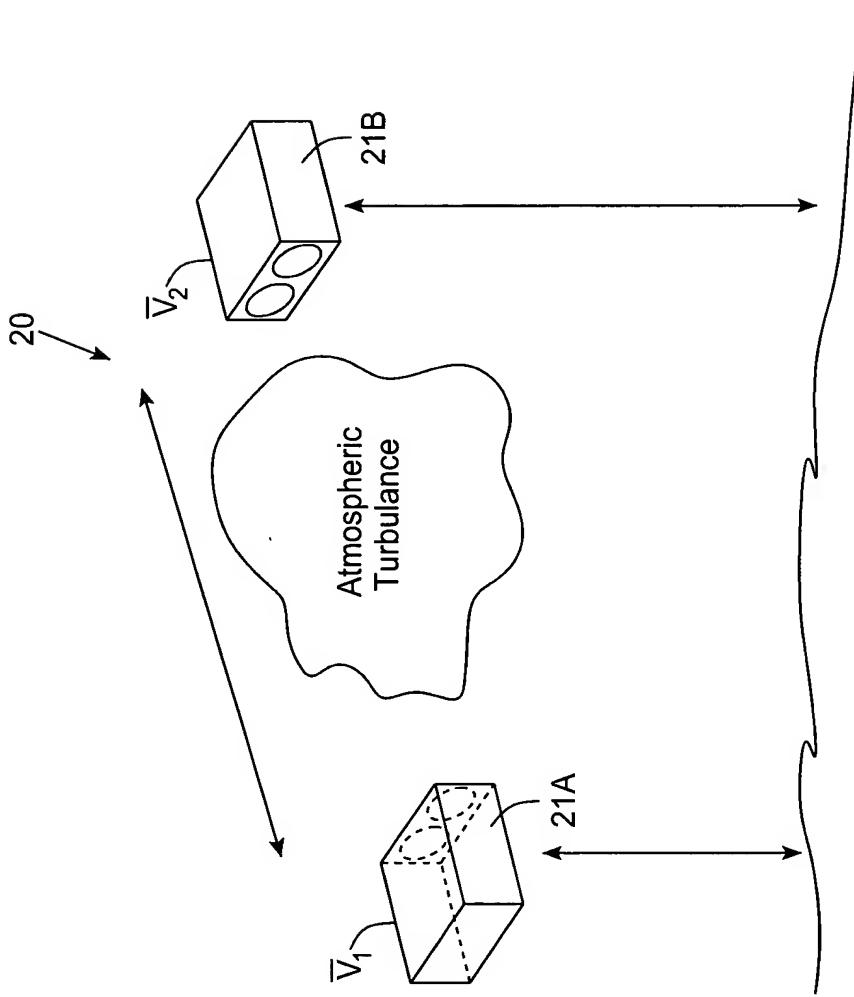


FIG. 8A

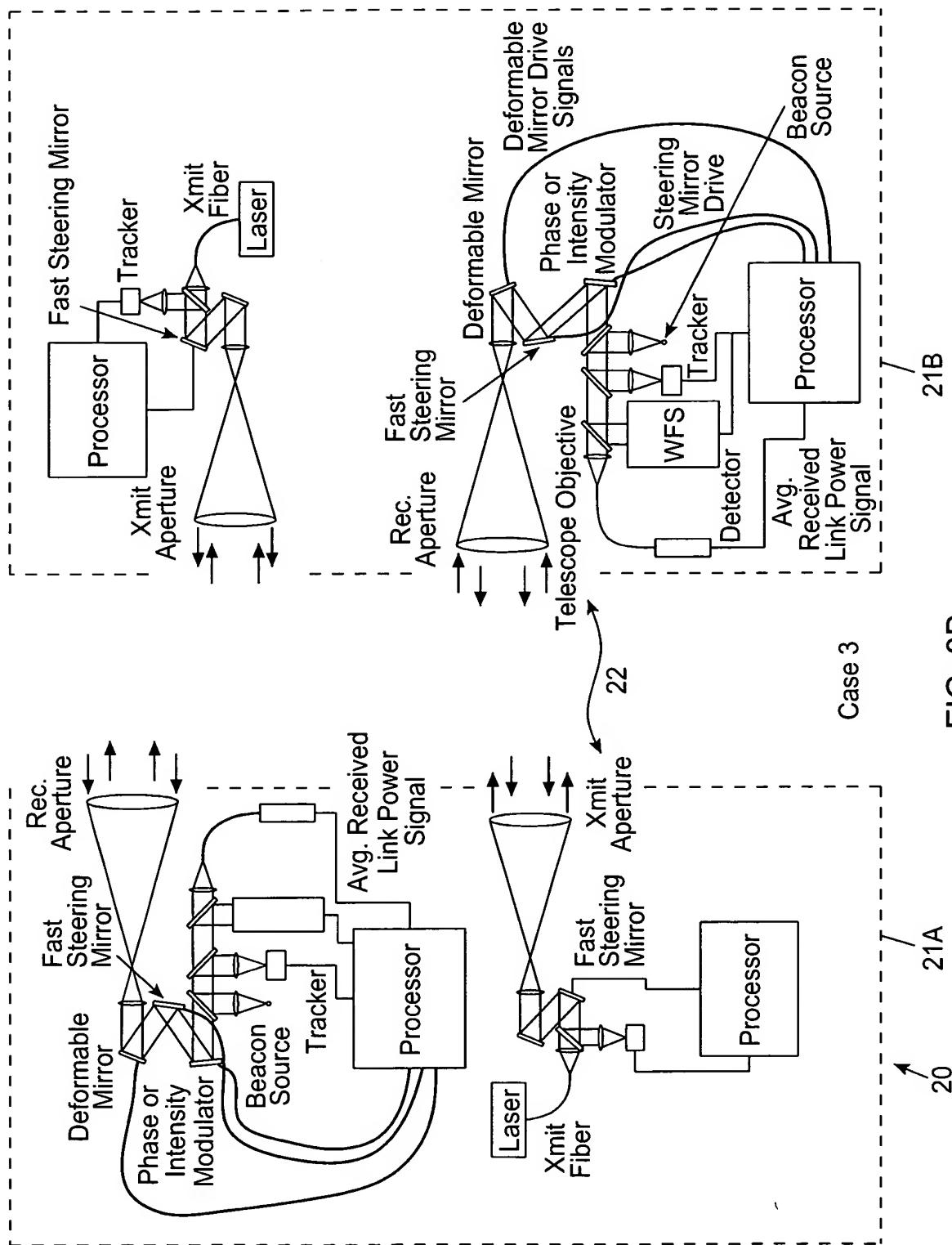


FIG. 8B

21A

21B

Case 3

Beacon Source

Processor

Processor

Processor

Processor

Processor

Beacon Source

Processor</

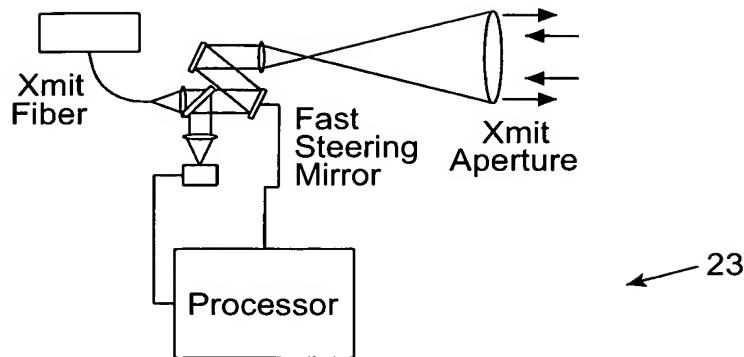


FIG. 8C

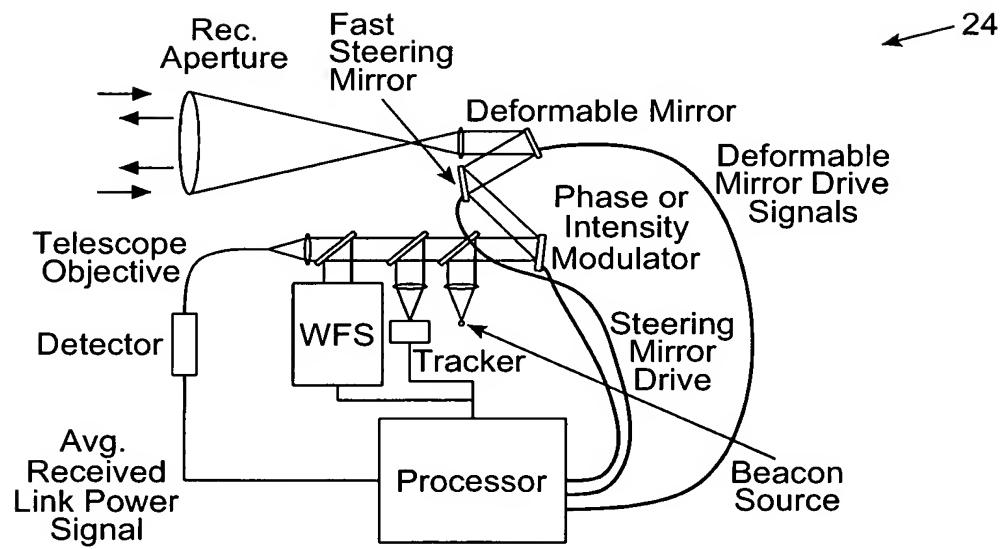


FIG. 8D

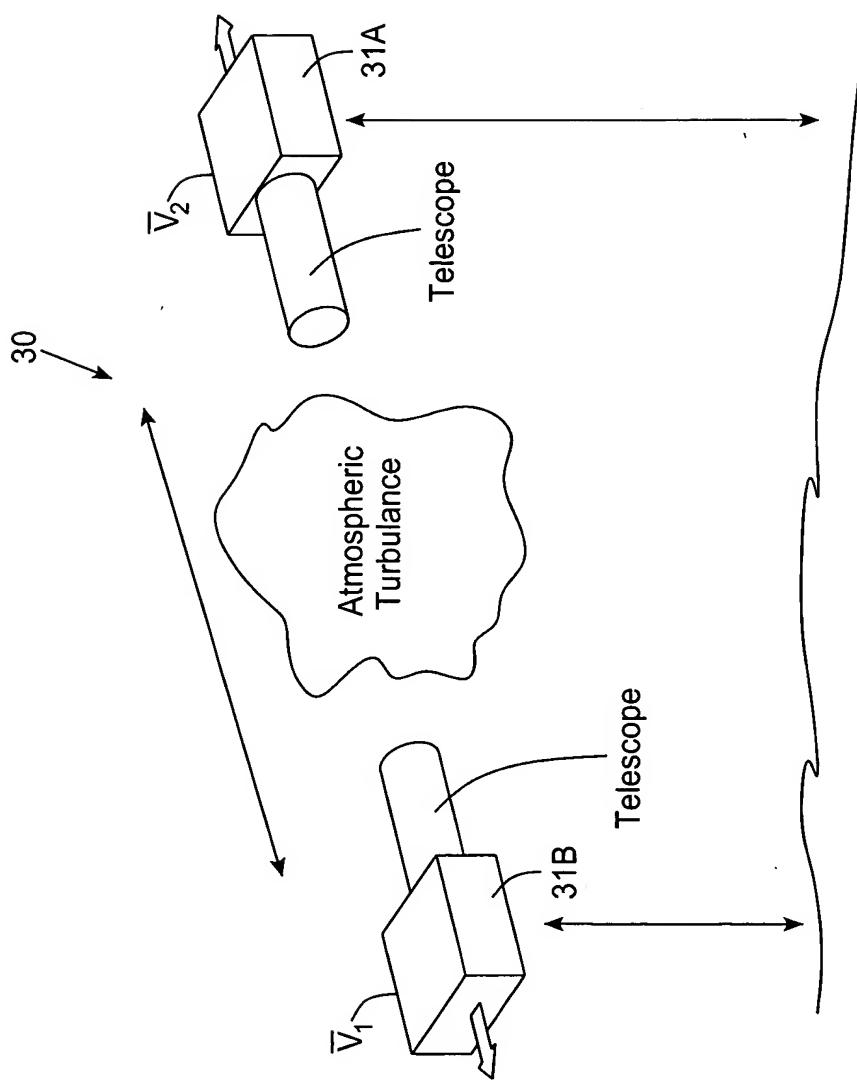
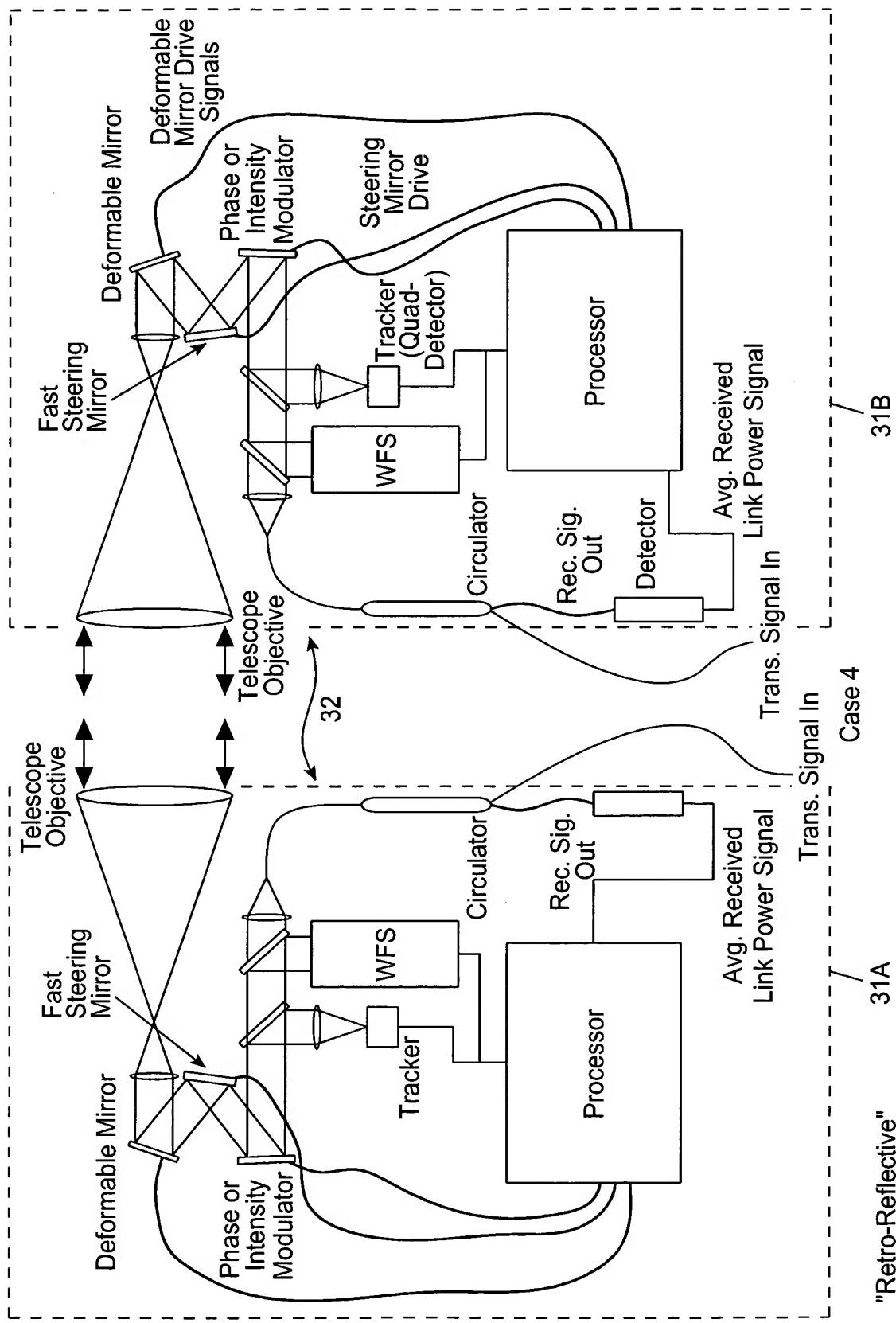


FIG. 9A



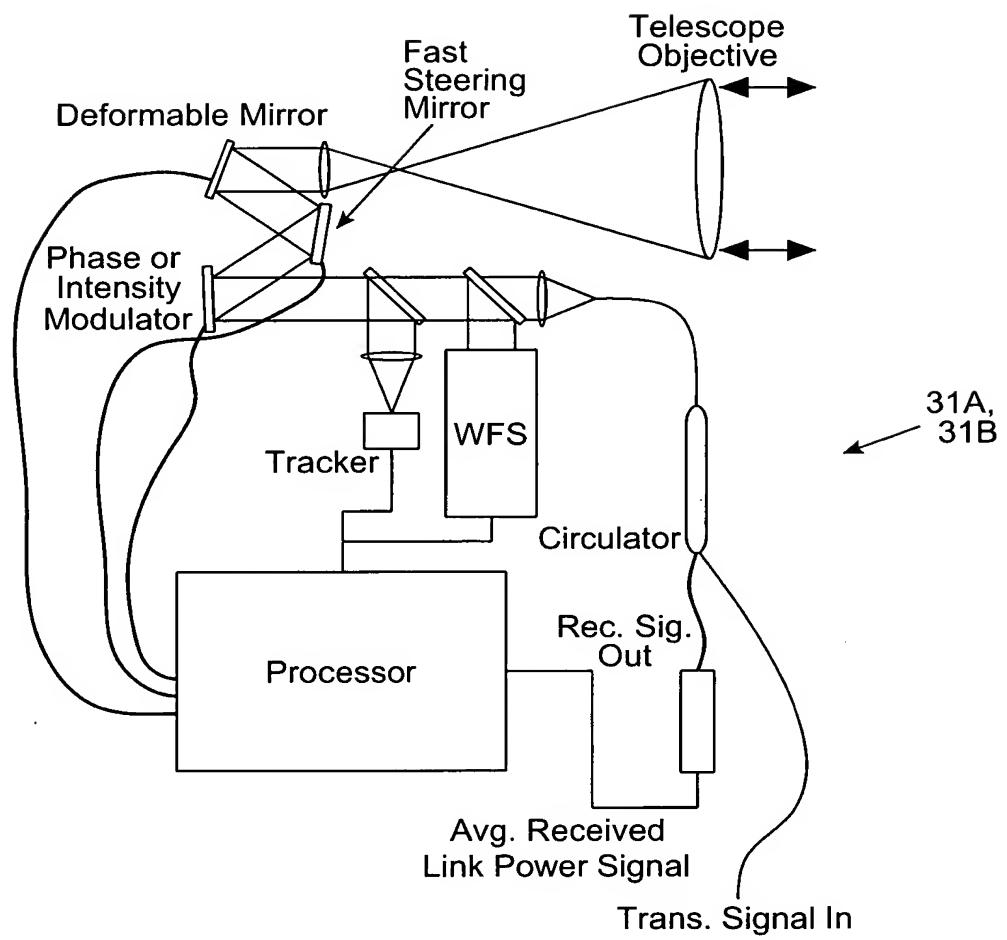
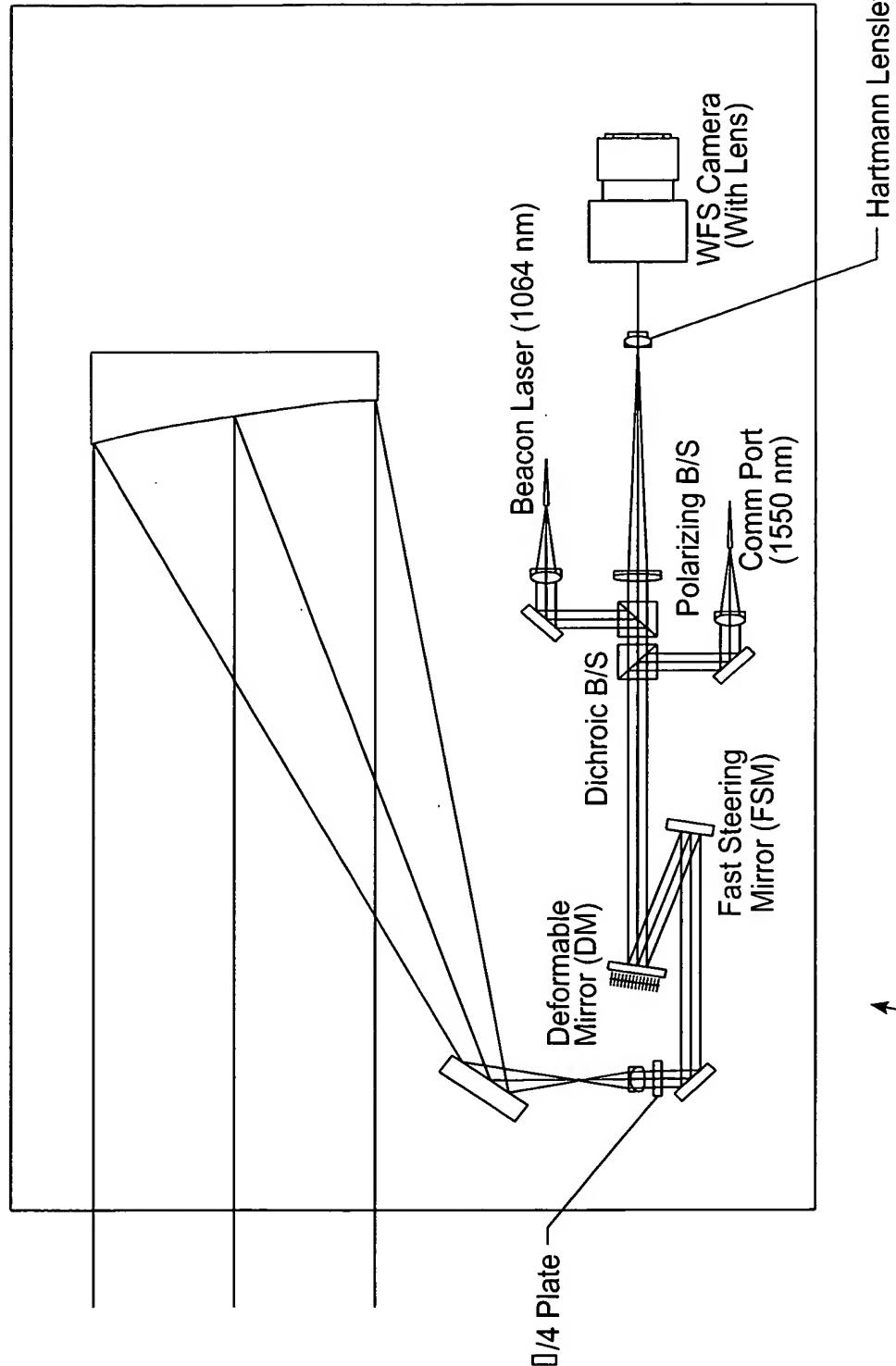


FIG. 9C

Communications Terminal



31A, 31B

FIG. 9D

Hartmann Lenslet Array

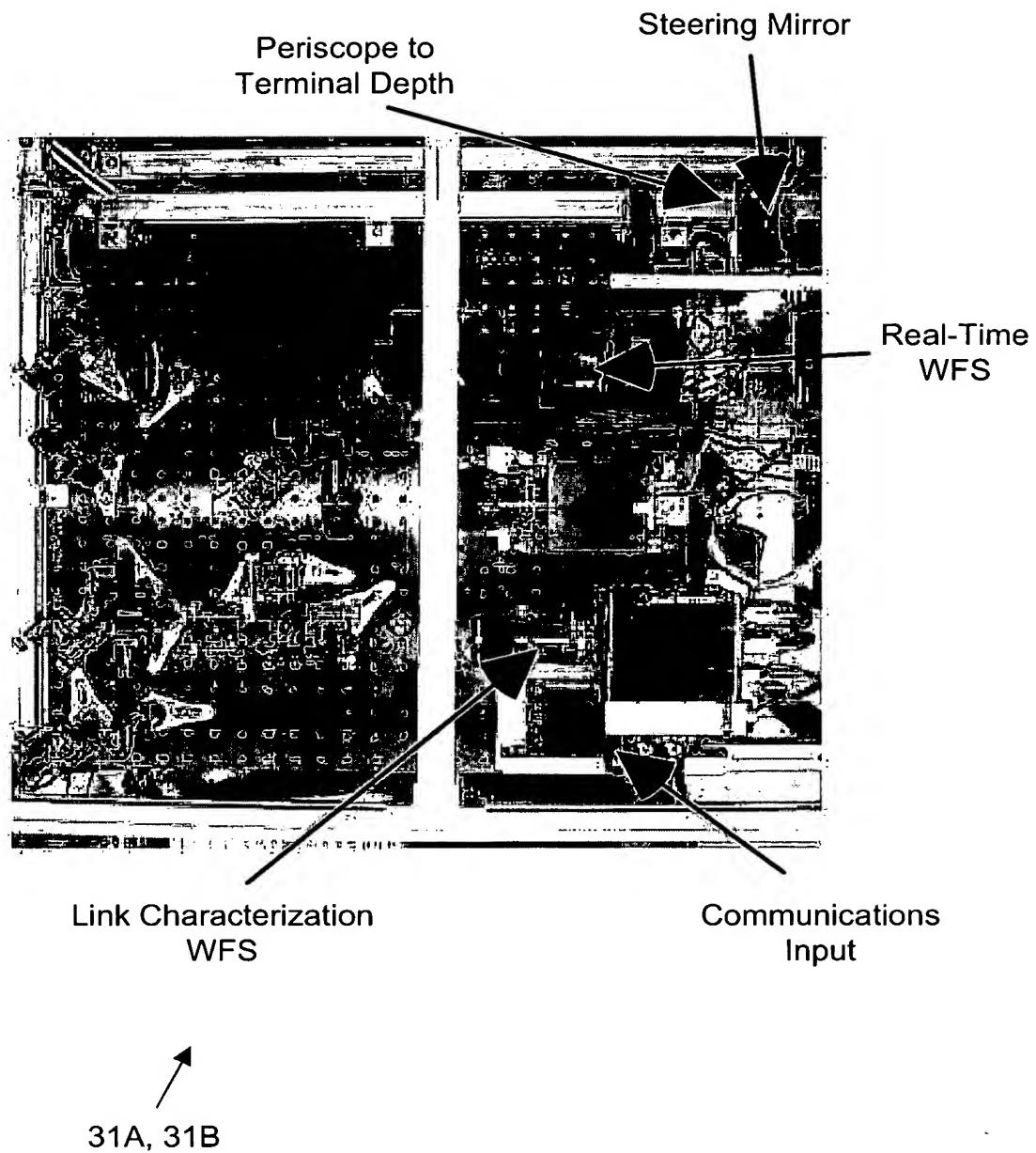
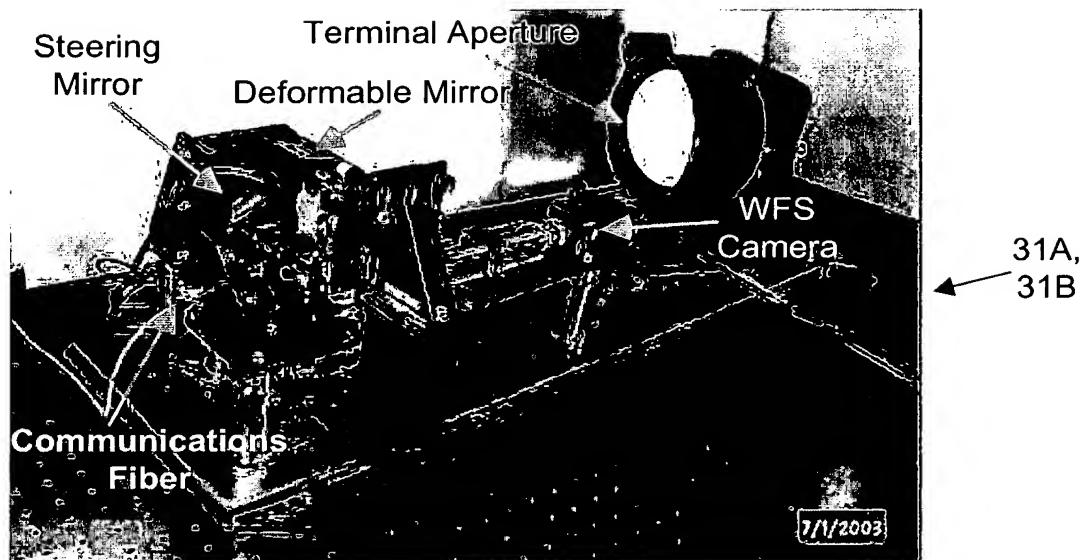


FIG. 9E



Compact laser communications terminal with 15cm aperture. This terminal has both a fast steering mirror and deformable mirror for atmospheric compensation. This terminal is set up as either a transmitter or receiver, with a separate fiber port for a tracking and AO beacon laser source (hidden by the DM mount).

These are both laser comm. terminals with traditional adaptive optics. A terminal with fade prevention would look similar. Note that these use reflecting telescopes (the one on the top has an 8 inch Schmidt Cassegrain telescope on the other side of the optical breadboard. In the schematic drawings a refracting telescope is shown for simplicity. Either can be used in practice.

FIG. 9F

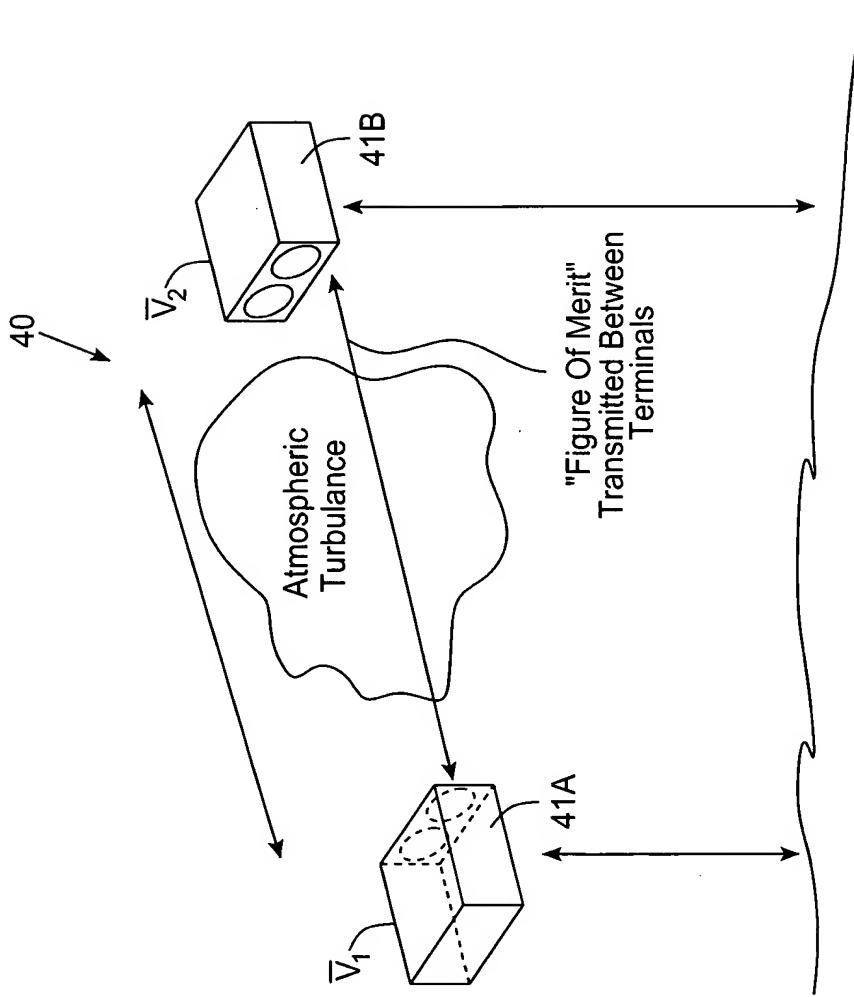


FIG. 10A

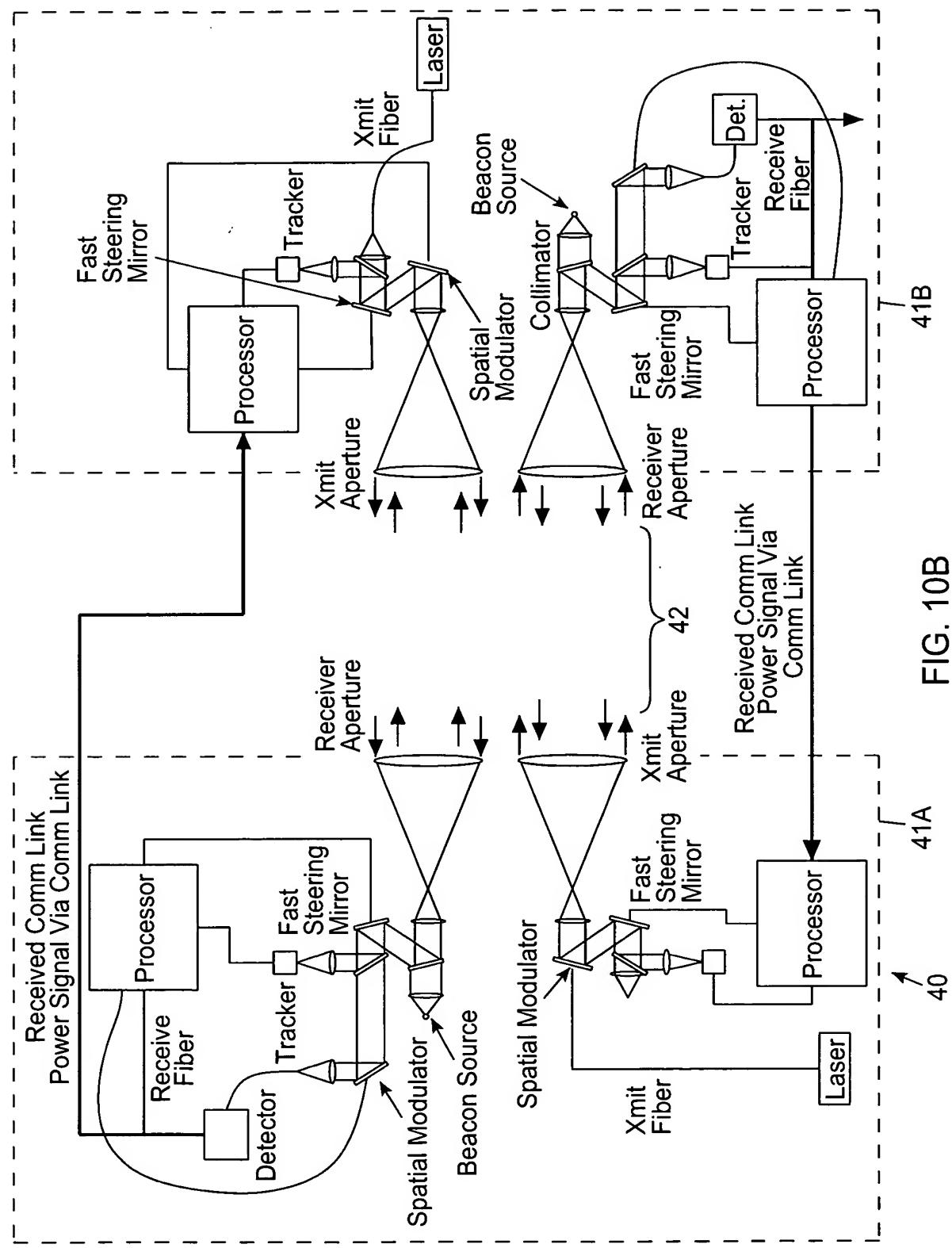


FIG. 10B

41A

40

41B